DOG BITE HEALTH BURDEN IN ALASKAN COMMUNITIES, 2002-2012

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Abstract

Dog bite injuries and fatalities are major public health problems nationwide. Alaska dog bite hospitalization rates are consistently higher than national rates, indicating that a health disparity exists. In Alaska dog bite injuries are inconsistently recorded and are not centrally reported. The objective of this study was to characterize dog bite injuries and victims in Alaskan communities for 2002-2012. A cross sectional study design was used in this first attempt to consolidate and analyze scattered statewide data regarding dog bites. Results showed that the vast majority of dog bites in Alaska went unreported, and confirmed previous research that the Alaska Native population and children aged 0-9 were disproportionately affected. This study was intended to provide an update of this public health problem for the State of Alaska, Department of Health and Social Services, Section of Epidemiology and to improve public and stakeholder knowledge.

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Chapter 1 Introduction

1.1 Background and significance

Dog bite injuries to humans in Alaska are a public health problem that heretofore was not well quantified (Castrodale, 2007b). The lack of consistent, detailed local and statewide data related to dog bites made assessment of the problem difficult.

Animals cause injuries to humans by such pathways as biting, scratching, and vehicle collision. Animals transmit numerous zoonotic infections responsible for human illnesses and fatalities. Dog bites contributed 80% of total animal bites in the United States (Patronek and Slavinski, 2009). From 2001 to 2003, approximately 4.5 million people in the United States were bitten by dogs annually; 885,000 (19%) of those bites required medical attention (Gilchrist, Sacks, White & Kresnow, 2008).

As of 2011, 36.5% of all households in the United States included dogs (an estimated 70 million dogs) (American Veterinary Medical Association [AVMA], 2012). This prevalence of animals in U.S. homes raises concerns about bite-related infections, rabies, and poses public health challenges.

Chapter 2 Literature Review

2.1 Overview

From April 18 through September 30, 1994 the Centers for Disease Control and Prevention (CDC) conducted a national Injury Control and Risk Survey (ICARIS) that assessed a variety of non-fatal injuries and risk factors. A study that described the magnitude of the problem in the United States summarized weighted data from ICARIS regarding dog bites (Sacks, Kresnow, & Houston, 1996).

According to ICARIS, an estimated 1.8% of the U.S. population experienced a dog bite annually. Adult males were more likely to experience dog bites than adult females ($p < 0.02$); children suffered dog bite injuries more often than adults. Among children however, there was no significant association between age or gender with bite rates (Sacks et al., 1996).

Data based on a national probabilistic survey of emergency department (ED) treated cases and official death reports from 1992 to 1994 showed that for each U.S. dog bite fatality, an estimated 670 hospitalizations and 16,000 ED visits took place (Weiss, Friedman & Coben, 1998).

From 1991 to 2001, dogs ranked third for animal-related fatalities in the United States: 208 fatalities with an average annual rate of 18.9/100,000 people (Langley, 2005). Dog bite fatalities disproportionately affected males, those who identified as white, and children under the age of five. By gender, the 208 fatalities consisted of 134 males (64%) and 74 (36%) females; by race, 164 were white (79%), 35 African American (17%), and 9 other races (4%). By age group, 81 victims (38.9%) were 0 to 4 years, 35 (16.8%) were

5 to 9 years, 7 (3.4%) were 10 to 19 years, 39 (18.8%) were 20 to 64 years, and 46 (22.1%) were 65 and over (Langley, 2005).

2.2 United States statistics

Dog bites are commonly viewed as potentially serious, but non-fatal injuries. Historically, they were not well documented unless the victims sought medical and/or police attention (Sacks et al., 1996). In 1996, the assignment of a code for dog bites (E code 906) in the International Classification of Diseases (ICD-9-CM) improved monitoring and reportable results for dog bite injuries on such data as hospitalization, emergency visits, and death rates (CDC, 2013).

In 2001, the CDC reported 368,245 nonfatal dog bite related Emergency Department (ED) visits, for a rate of 129.3/100,000 people (Gilchrist, Gotsch, & Ryan, 2003). The injury rate was highest for children ages 5 to 9 years and decreased with increasing age. In contrast to the earlier ICARIS results, the dog bite injury rate was significantly higher for boys than for girls (293.2 versus 216.7/100,000; $p = 0.037$); however, for teenagers >15 years of age, the difference between male and females rates was not statistically significant (Gilchrist et al., 2003). The report also described types of injury, injury location, age groups, and work-related conditions.

In 2008, updated national data, based on outcomes of the Healthcare Cost and Utilization Project, showed 316,200 nonfatal ED visits and 9,500 hospitalizations due to dog bites in 2008, which yielded rates of 103.9/100,000 ED visits and 3.1/100,000 hospitalizations. The rate of ED visits due to dog bites in 2008 was somewhat lower than the rate in 2001 (103.9 versus 129.3/100,000). The highest rates of dog-bite related ED visits in the U.S. were in the Midwest and Northeast (109/100,000 and 108.5/100,000),

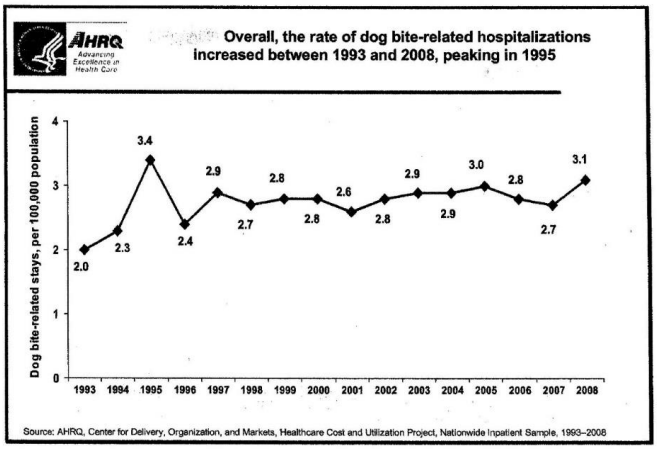
and the lowest rate was in the West (93/100,000). The dog bite hospitalization rate was highest in the Northeast (3.9/100,000) and lowest in the West (2.5/100,000) (Holmquist and Elixhauser, 2010). The average length of stay was 3.3 days with an average cost of $18,200. In contrast, the length of an average non-dog bite injury related hospitalization was 5.5 days, and the cost was $12,100 (Holmquist and Elixhauser, 2010).

Children under the age of 10 had the highest rates of dog bite related ED visits: 175/100,000 people for 0 to 4 year olds and 199.3/100,000 for 5 to 9 year olds. Elderly persons (85 and older) had the lowest dog bite related ED visit rate (44.9/100,000). The highest hospitalization rate (4.5/100,000) was for 65 to 84 year olds; the rate for children under 5 years old was 4.0/100,000 (Holmquist and Elixhauser, 2010).

While both genders had a dog bite hospitalization rate of 3.1/100,000 people, males had a higher rate of emergency department visits (110.4/100,000) than females (97.8/100,000) (Holmquist and Elixhauser, 2010). Rates for ED visits in rural areas (119.3/100,000) were more than 4 times higher than in urban ones (29.4/100,000), similar to hospitalization rates, which were almost 3 times higher in rural areas (2.9/100,000) than urban (1/100,000) (Holmquist and Elixhauser, 2010).

Figure 1 illustrates the U.S. dog bite hospitalization rate for 1993 to 2008. Dog bite related hospitalizations increased by 55% from 2.0/100,000 people to 3.1/100,000 with a peak in 1995 of 3.4/100,000 (Holmquist and Elixhauser, 2010).

Figure1. *Trend of dog bite hospitalization rates 1993-2008 (Holmquist and Elixhauser, 2010)*



Within the general public, controversy exists regarding the aggressiveness of certain breeds and their likelihood to bite. Issues include banning specific breeds and responsible stewardship. Breeds associated with dog bite fatalities have received the most unfavorable attention from the general public. A public educational website "dogsbite.org" had been collecting anecdotal evidence through tracking specific individual media stories and obituaries in the U.S. During the 2005-2013 period, Pit bulls and Rottweilers accounted for 74% of 283 total dog related deaths; Pit bulls alone were responsible for 62% of the total recorded deaths. From 1979 to 1998, at least 25 breeds of dogs were involved in 238 dog related fatalities in the U.S., with Pit bulls and Rottweilers involved in more than half of those deaths (Sacks, Sinclair, Gilchrist, Golab, & Lockwood, 2000). Of 227 reports with relevant data, 58% involved unrestrained dogs on their owners' property and 17% involved restrained dogs on their owners' property; 24% involved unrestrained dogs off their owners' property and 1% involved restrained dogs

off their owners' property. Although Pit bulls and Rottweilers remain in the center of unfavorable media attention, due to difficulties in identification of a dog's breed with certainty, enforcement of breed-specific ordinances raise constitutional and practical issues (Sacks et al., 2000). And while Pit bulls and Rottweilers were clearly implicated in a majority of fatal attacks, the evidence for singling out these breeds for dog bite injuries in general is less clear. The high prevalence of ownership of these breeds in 2005-2013 meant that they were not the highest risk for dog bite by rate. Further, Pit bulls and Rottweilers are also at times intentionally trained for aggressive behavior, which complicates comparison. (AVMA, 2012b).

2.3 Alaska statistics

Dog bite injury hospitalizations were not as numerous as falls or motor vehicle accidents, but were ranked in seventh place as the leading cause of non-fatal injury hospitalizations in Alaska for 2005-2009. Dog bite injuries required hospitalization of young children ages 1-9 with the same general incident frequency (21-24 incidents) as suffocation injuries, motor vehicle injuries, and cuts (Rarig & Hull-Jilly, 2012). The physical and emotional toll on victims, especially children, was significant. When people with more serious injuries were airlifted to regional medical facilities, there were even greater financial and emotional costs.

In Alaska, fatal and non-fatal dog bite injuries have been neither uniformly reported nor centrally recorded. Entities that track dog bites in Alaska include some municipal and borough offices, and local police departments, animal control personnel, and health care providers. According to the State of Alaska's Section of Epidemiology (SOE), which used data from the Alaska Trauma Registry (ATR, 1991 - 2002), 288 dog

bite victims were hospitalized for at least one day and 9 total deaths were recorded. Of the injuries that required hospitalization, 123 (approximately 43%) occurred to the head and/or neck and 115 (approximately 40%) to the upper extremities (Castrodale, 2007a). The average annual rate of hospitalization was 9.3/100,000 Alaska Native people compared to a rate of 2.8/100,000 for non-Alaska Native people. The average time hospitalized was 4.6 days for Alaska Natives, compared to 2.5 days for non-Native Alaskans. The highest hospitalization rates occurred in rural areas of Northern and Southwestern Alaska (Castrodale, 2007a).

Alaskan children <5 years of age were at the greatest risk of dog bite injuries to the face and neck, with a hospitalization rate higher than three times the national rate 15.2./100,000 people (Castrodale, 2007b) versus 5.0/100,000 (Quinlan & Sacks, 1999). Rural areas experienced a heavier burden of dog bites than urban settings. Rural area ED visit rates were four times greater than in urban settings (119.3/100,000 people versus 29.4/100,000) and there were three times as many hospital stays in rural areas versus urban ones (2.9/100,000 versus >1.0/100,000). (Holmquist and Elixhauser, 2010).

A nationwide study (Bjork, Holman, Callinan, Hennessy, Cheek, & McQuiston, 2013) on dog bites among American Indian and Alaska Native (AI/AN) children <20 years old who visited Indian Health Service and tribal health facilities between 2001 and 2008, reported that hospitalization rates and outpatient visits due to dog bite were higher for AI/AN males than females: 4.4 vs. 2.4/100,000 and 444.9 vs. 339.1/100,000 respectively. The average annual dog bite hospitalization rate was almost twice as high among AI/AN children in Alaska (6.1/100,000) than the general U.S. child population of all ethnicities (3.4/100 000) (95% CI, 2.9-3.3/100, 000).

The hospitalization rate for young AI/AN males in Alaska was almost 3 times higher (9.7/100,000 people) than young males in the general U.S. population (Bjork et al., 2013). The average annual dog bite outpatient visit rate was highest in Alaska: 596.4/100,000 compared with an overall annual rate in AI/AN children <20 of 392.4/100,000. The highest outpatient visit rate was observed in Alaskan AI/AN 5-9 year-old males at 1030.5/100,000. For hospitalized children, open wound diagnoses were most commonly seen on the head, neck, and face (45.5% in AI/AN children and 59.3% in U.S. children) (Bjork et al., 2013).

Children were at greater risk than adults for dog bites probably due to their small size and unawareness about proper interaction with dogs (Castrodale, 2007b). Boys were injured more often than girls, indicating that human behavior might have been a factor (Overall & Love, 2001). Having a dog or dogs in the household and the number of dogs was associated with an increase of dog bite incidence (Gilchrist et al., 2008). Alaskans use dogs for hunting, mushing, handicap service, and companionship and keep them in both indoor and outdoor settings. "Home" was the place of injury for 59% of Alaskan dog bite victims although the definition of "home" included either a victim's home or a visited household (Castrodale, 2007b).

2.4 Dog bites and zoonotic diseases

A dog bite can lead to laceration of soft tissues, severe infections that may result in disability, and partial or complete traumatic limb amputation. Many bites are not reported to a health professional unless the injuries are serious or become infected. *Pasturella* spp. are commonly isolated from infected bite wounds. Other aerobes such as *Staphylococcus* spp. and *Streptococcus* spp., and anaerobes such as *Fusobacterium* and

Bacteriodes commonly lead to bite wound infections (Talan, Citron, Abrahamian, Moran & Goldstein, 1999).

Rabies is a deadly zoonotic disease commonly associated with infected mammal bites. Transmission of the rabies virus, which attacks the nervous system, occurs through contact of infected saliva with broken skin or mucous membrane. Household pets can become infected after contact with other infected pets or wildlife. Even though rabies is a preventable disease for humans and pets and post exposure treatment is available, untreated cases still result in fatalities. In the United States, human rabies fatalities are rare (fewer than three cases reported each year), usually in people who did not seek medical attention due to unawareness of exposure or the exposure occurred outside of the U.S. Low rates of infection and fatality were achieved by implementing dog and cat vaccination campaigns, vaccination laws, and rabies post-exposure treatment (CDC, 2013).

In 2008, a random cross sectional telephone survey of 922 households was performed in Brazos County, Texas on the knowledge and perception of dog associated zoonosis. The study showed a lack of knowledge about zoonotic diseases among respondents which could seriously impact their health and that of their families. Only 59% of respondents were aware that rabies exposure without treatment could result in death. Fifty-six percent of respondent households owned dogs. Five factors were shown to be significantly associated with reporting to authorities dog bite incidents by an unknown dog: (1) those respondents who believed that rabies can be transmitted by bats were 5.5 times more likely [95% confidence interval (CI)] to report than those who did not have this belief; and (2) those who believed that they had been exposed to rabies were

3.1 times more likely to report [95% confidence interval (CI)]; The remaining three factors all resulted in a 2.3 times greater likelihood to report an incident [95% confidence interval (CI)]: (3) living inside the boundaries of a city or town; (4) being female; and, (5) being over 60 years of age. Dog ownership was not associated with reporting (Bingham, Budke & Slater, 2010).

Chapter 3 Research Methods

3.1 Problem statement

Problem A: Fatal and non-fatal dog bite injuries in Alaska are serious problems, yet have not been centrally recorded. Alaska dog bite hospitalization rates are consistently higher than national rates, indicating that health disparities exist. State data suggest that children and Alaska Native populations are disproportionally impacted by dog bite injuries, which places a burden on many communities (Castrodale, 2007a).

Problem B: While severe injuries that required hospitalization are reported through the ATR, usually minor dog bite injuries are not tracked due to lack of reporting by victims, poor record keeping at the local level and the fact that dog bites are not a state-mandated reportable condition. Although many municipal, borough and city level entities track dog bites through local animal control and police departments, no one has attempted to collect and analyze this statewide data in Alaska.

Due to limited data regarding cases with no medical attention and out-patient based estimates, Alaskan policy makers lack support to dedicate resources to address the issue. Research is needed to aggregate existing scattered data and analyze them in order to provide an update of this public health problem.

3.2 Goals, aims, and objectives

From discussions with the State of Alaska Section of Epidemiology, the researcher became aware of the availability of hospitalization data regarding dog bites from the ATR, and that the same data source had been used for an Alaskan dog bite study

a decade earlier. This facilitated comparison between the two studies. Based on literature review, it was also anticipated that the number of hospitalizations and deaths were only a small top portion of the overall burden of injury "pyramid". The base of the pyramid might be comprised of injuries that were not reported, not treated or treated outside the health care system, followed by a portion of injuries treated in primary care facilities, then injuries that resulted in emergency department visits, followed by hospitalization, and fatal injuries (WHO, 2014). Thus, in an effort to characterize a larger portion of the pyramid, the researcher also determined that an effort should be made to collect local data on dog bite reports, in addition to hospitalization data, to estimate the dog bite prevalence.

Goal A. The first goal was to characterize reported dog bite injuries in Alaska for 2002 to 2012. The most recent analyzed data regarding deaths and hospitalizations from dog bite injuries in Alaska were from 1991 to 2002 (Castrodale, 2007a). There was a need to perform an updated analysis of available ATR data. In order to provide an overall assessment of dog bites in Alaska there was also a need to collect and aggregate scattered dog bite records from local sources such as animal control entities and police departments.

The aims, questions and objectives associated with Goal A are:

Aim A. Gather and analyze scattered existing data regarding dog bite injuries in Alaska.

Research Question A1. What are the existing data sources for dog bite injuries and their treatment in Alaska?

Objectives A1.

- Conduct a literature review in order to identify reporting entities in Alaska.
- Contact identified agencies for data availability and continuity.

Research Question A2. What types of available information could be used to characterize dog bite injuries and victims in Alaska for 2002 to 2012?

Objectives A2.

- Collect and evaluate available data regarding dog bite deaths, hospitalizations, and recorded injuries for 2002 to 2012.
- Collect and evaluate data describing dog bite incidences, victims, and animal information for 2002 to 2012.
- Analyze data to quantify public health burden of dog bites on Alaska communities for 2002 to 2012.

Goal B. Propose a model of reporting dog bite injuries in Alaska for future reference.

The aims, questions and objectives associated with Goal B were:

Aim B. Determine a unified format that could be used by different entities in Alaska for further data collection.

Research Question B. What are the shared core fields of existing data sets related to dog bites in Alaska?

Objectives B.

- Review existing data sets, compare them, and select core characteristics.
- Develop a unified format for reporting of dog bites and dog attacks on humans in Alaska.

By accomplishing these objectives, the project met the goals and provided an update of the dog bite public health problem in Alaska. The intended audiences for this information include injury prevention and other health industry professionals, animal control personnel, public safety staff, offices of environmental health, and policy makers.

3.3 Protection of human subjects and data collection.

The proposed research was based on existing records accumulated and summarized by Alaskan animal control facilities and governmental entities, and the ATR of hospital admissions. The researcher requested that names of victims or animal owners not be provided. Injuries were referred to in summary form by hospital Abbreviated Injury Scale (AIS) and/or general body location. The AIS is an anatomical scoring system developed by the Association for the Advancement of Automotive Medicine (AAAM), with injuries ranked on a scale of 1 to 6—1 being minor, 2 moderate, 3 serious, 4 severe, 5 critical, and 6 un-survivable. "This represents the 'threat to life' associated with an injury and is not meant to represent a comprehensive measure of severity. The AIS is not an injury scale, in that the difference between AIS1 and AIS2 is not the same as that between AIS4 and AIS5" (ATR, 2013a, p.5).

All collected information was kept in a personal computer with the password only accessible by the researcher. The computer was kept in a secure location at all times during the research. Any individual personal data identifiers were removed, and data were destroyed upon project completion. The final report output was reviewed for any information that could inadvertently reveal a specific individual, particularly regarding details from smaller communities.

3.4 Methods

Data on dog bites in Alaska for 2002-2012 were collectively analyzed using a cross-sectional study design and SPSS software for descriptive statistical analysis. The project was not designed to determine the cause-effect relationships.

Data collection. Throughout Alaska, different entities track dog bites for specific populations, but dog bite data are not required to be reported to central public health officials. A contact list of 33 agencies was created based on SOE resources and Internet research, including borough and local governments, police departments, and animal control agencies.

The researcher telephoned each contact, then sent an explanatory letter with a spreadsheet template for data submission, time frame, and researcher contact information via email and/or fax. The researcher suggested the following categories be entered into the attached Excel spreadsheet (Appendix J): (a) incident information (date of incident, geographical location by Alaska region, circumstances, and outcome of investigation); (b) victim information (age, gender, ethnicity, location/type of injury, and outcome of injury); and (c) animal information (breed of dog, spay/neutering status, dog ownership, history of aggression, vaccination status, and restrained or not prior to incident). From August through October 2013, the researcher made three additional contact attempts, as needed, to each entity through email and telephone. The reporting agencies submitted data without any personal identifiers.

Governmental entities contacted ranged from borough level to individual community entity such as policeman or animal control employee. These entities were categorized by the six regions on the Alaska Department of Labor (ADL) regions map

(Appendix F). Data from the North Slope Borough were used for the Alaska Northern region; data from Fairbanks North Star Borough (FNSB) were used for the Interior region; data from Municipality of Anchorage (MOA) were used for the Anchorage region; data from Kodiak were used for the Gulf Coast region; and data from Petersburg, Sitka, Wrangell, Juneau, and Skagway were used for the Southeast region. Data from the Southwest region were unavailable.

In addition to requesting data from 33 Alaskan agencies, a data request regarding dog bite deaths and hospitalizations was submitted to the ATR, which collects data from all acute care hospitals in Alaska. Alaska Trauma Registry cases were selected based on patient records listed under the dog-bite injury code (E 906.0**)** as an external cause of an injury, as defined by ICD-9-CM (National Center for Health Statistics). For 2001 to 2011 an ATR case was defined as a patient hospitalized for at least one day due to dog bite, including persons transferred between acute care hospitals or those who died in a hospital setting. Data for 2012 were unavailable at the time of this study.

Data analysis. The researcher created two data sets; the first, based on ATR hospitalization records for 2001 to 2011, and the second, based on available reports from local and borough animal control authorities for 2002 to 2012. The ATR sample size was 292 cases and included all fatal and non-fatal registered dog bite injuries resulting in hospitalization for the given time frame. The ATR data set did not include emergency department visits. The second data set comprised 8,942 total bites over the 2002-2012 period, but for analysis purposes only 4,983 bites from the 2007-2012 period were used due to documentation inconsistencies. The researcher determined that the statewide entity

data was usable when it was consistently accumulated and reported over many years, was within the time frame of the study, and was accessible to the SOE and researcher.

Age groups were defined according to previous studies by Castrodale (2007b) on Alaska dog bite hospitalization rates and by Bjork et al. (2013) on U.S. and Alaskan hospitalization rates of AI/AN patients <20 years old to allow for comparison between the studies. Analysis by Castrodale (2007b) covered all ages, while the Bjork et al. (2013) analysis covered only ages 0 to 19 for AI/AN children. To make proper comparisons with the Bjork et al. (2013) study, the first four age categories (0 to 4, 5 to 9, 10 to 14, and 15 to 19 years old) were also combined into one category (0 to 19 years old). In order to compare Alaska Native and non-Alaska Native data, the researcher performed a separate analysis for cases with known race and number of hospitalizations; length of stay for each group was calculated as the total of the results of hospitalization frequency multiplied by total number of hospital days, then followed by a mean calculation.

Average annual hospitalization rates for each category were calculated based on the July 2007 Alaska annual population estimate as a mid-point number for the period of the study (State of Alaska Department of Labor/U.S. Census Bureau, 2007) using the following formula: Total hospitalizations/population estimate for particular category x 100,000/11 years. Dog bite hospitalizations by age group, Abbreviated Injury Scale (AIS) score, and type of injuries by age groups were collapsed after age of 10 years due to the importance of analyzing high risk populations based on previous studies and limited number of observations per adult category.

ATR dataset. The ATR dataset contained information regarding the age, race, and gender of each victim. Also included was the date of the injury and narrative

information regarding the circumstances of the injury and geographical/location information. Injury specific information was coded using the ICD-M injury coding system and the AIS threat to life score. Statistical analysis was performed for each patient's first two assigned ICD-M codes (or single assigned code as appropriate) (Appendix B, Table B-6). A third code was utilized by 29% of admissions and a fourth code was used by 16%. Only the first two codes were used to analyze type of injuries and body location of injury. For other analysis involving type of injuries and length of hospital stay, only the main (first) code was used.

Injury codes (ICD-9-CM) included open wounds, fractures, traumatic amputation, other and unspecified injuries (including injuries of internal organs, nerves, blood vessels, superficial injuries). Open wounds (ICD-9-CM codes 870-897) included head/neck/face (870-874), torso (875-879), upper limb/s (880-884), lower limb/s (890-897), traumatic amputation hand/arm (885-887), and traumatic amputation foot/lower limb/s (895-897), Fractures consisted of injuries to the skull/neck/torso/vertebral column (800-811), upper limb/s (812-819), and lower limb/s (820-827).

Each case had an AIS score which was used for cross tabulation analysis with length of hospital stay, type of injury, and gender. Narratives explaining the circumstances of dog bite incidents were reviewed and most common patterns described.

Each case record also contained "place of injury" and "place specific" codes, both of which referred to the physical location of the incident. Place of injuries (E code, ICD-9-CM) and place specific (narrative description) entries were reviewed and, where the incident location description was clearly not correctly matched to the proper E location code, the data was recoded; for example "neighbors home" recoded as "residence" and

"other" recoded as "street or highway, recreation area, industrial, etc." These were then recalculated manually according to the ATR 2013 data elements**.** Total hospital days (length of stay) for each case were calculated by summing up all hospital days entries, up to three acute care hospitalizations for a particular injury (ATR, 2013). ATR annual hospitalization rates for each year were calculated by dividing the number of annual hospitalizations by the Alaska annual population estimate for that year. Hospitalizations and dog bite records from entities were categorized by the six Alaska geographic regions on the ADL regions map (Appendix J) and presented in the tables accordingly. Average annual hospitalization rates by regions were calculated using the same formula.

Local entity datasets. Data provided by animal control entities were inconsistent and only partially completed; therefore, the only statistics used from those that provided data were the total number of dog bites. The documented 2007 to 2012 time frame was used to calculate the prevalence of dog bites reported to Alaskan entities using the following formula: Prevalence = all reported dog bite cases/regional population of reporting entities x 100,000/6 years. The 2010 U.S. Census (U.S. Census Bureau, 2010) provided regional population data for the geographical locations represented by the data responses. The researcher used population figures only from those boroughs and communities reporting usable data, and not the population figure for an entire region if the entire region did not report usable data. Of the nine entities reporting data, regions containing 64% of the state's population were covered. This was likely more representative of urban areas than of rural ones due to lack of reporting from the Southwest Alaska region and limited reporting from other rural areas.

Chapter 4 Results and Discussion

Of the 33 governmental agencies contacted, only nine submitted information; three reported data unavailability for the time frame of interest due to insufficient recordkeeping or computer issues; and 21 were not responsive, lost contact, or encountered other impediments to the data collection process. One entity provided information that was discarded due to its containing only one year of data.

4.1 Alaska Trauma Registry dataset

The Alaska Trauma Registry recorded 292 hospitalizations due to dog bite during 2001 to 2011. Data for 2012 was unavailable at the time of the study. All 292 dog bite victims had at least one principal ICD-M code, representing a diagnosis established at the time of hospital admission. Of these 292 victims, 68% had a secondary code, representing a coexisting condition at the time of admission or developed during hospital stay.

For 2001 to 2007, there was a relatively consistent frequency of 27 to 33 hospitalizations per year due to dog bite. In 2008, the number of hospitalizations dropped to 22; the lowest number during the study occurred in 2009 (12 hospitalizations); in 2010, there was a spike with 33 hospitalizations; then in 2011 the number dropped to 20 hospitalizations (Table A-1, Apendix A). In looking at each month collectively for 2001 to 2011, most of the injuries happened in early summer through early fall (May = 34, June = 38, July = 36, August = 29, September = 31). During October through April (Alaskan winter) 10 to 25 monthly events were recorded (Table 1).

Table 1
Month of Dog Bite Hospitalization Occurrence, ATR 2001-2011.

Month	Frequency	Percent
January	15	5.1
February	19	6.5
March	25	8.6
April	19	6.5
May	34	11.6
June	38	13.0
July	36	12.3
August	29	9.9
September	31	10.6
October	18	6.2
November	18	6.2
December	10	3.4
Total	292	100.0

Note: Source: ATR, 2013b.

The annual dog bite hospitalization rates for 2001 to 2011 ranged from 1.73 to 5.13/100,000 people, with an overall eleven year average rate of 3.9/100,000 based on an estimate by ADL/U.S. Census Bureau (Table A-2, Appendix A) (Figure 2).

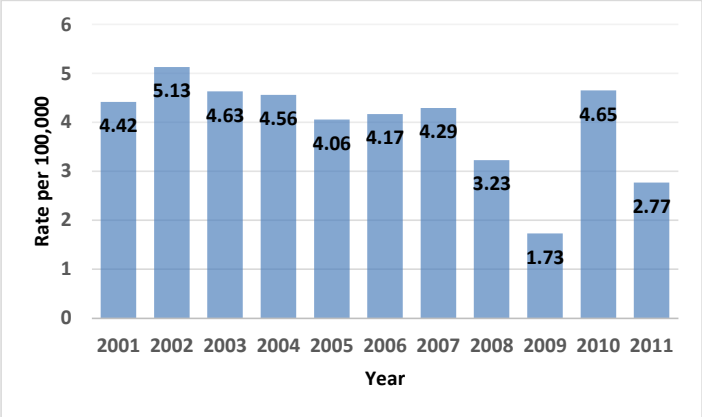


Figure 2. *Annual dog bite hospitalization rates per 100,000 people, 2001-2011 (ATR, 2013b).*

By age group, the highest annual rate of hospitalization (11.3/100,000) was for 0- to 4-year-old victims, followed by rate of 8.7/100,000 for 5- to 9-year-old victims (Table A-3, Appendix A).

For 2001 to 2011, dog bite victims spent a total of 754 days in the hospital, with a range of 1 to 28 days, a mean of 2.83 days, and a standard deviation of 3.27 (Table A-4, Appendix A). Alaska Trauma Registry referenced these data as "Total hospital days for patient's stay in up to three acute care hospitalizations for this injury" (ATR, 2013b).

Out of 292 dog bite injury hospitalizations, 104 patients (35.6%) required a one day stay, 57 patients (19.5%) required two days, and 48 patients (16.4%) required three days, and 26 patients had an unknown length of stay. Hospital stays of 4 days and over were less common: 21 patients (7.2%) for four days, and 12 patients (4.5%) for five days. Stays > 6 days were less than 2% of the patients (Table A-5, Appendix A).

The Northern region of Alaska reported the highest hospitalization rate due to dog bites (8.5/100,000 people), followed by the Southwest region (7.0/100,000). The

Southeast reported the lowest rate (1.7 per 100,000) (Table 2 and Figure 3). The average annual rate of dog bite hospitalizations with known regions was 3.8 per 100,000.

Table 2
Annual Dog Bite Hospitalization Rates for Alaska Regions, 2001-2011.

Region of injury occurrence	Census population, 2007	Hospitalization frequency, 2001-2011	Annual rate per 100,000, 2001-2011
Northern region	23,548	22	8.5
Interior region	109,336	54	4.5
Southwest region	38,782	30	7.0
Anchorage region	362,163	133	3.3
Gulf Coast region	76,121	36	4.3
Southeast region	70,219	13	1.7
Outside of Alaska		1	
Unknown		3	
Total	680,169	288[a]	3.8

Note: [a]Excluded records if region was unknown or outside of Alaska.
(State of Alaska Department of Labor, 2007)

Sources: ATR, 2013b.

July 2007 estimate. Annual Estimate by Alaska Department of Labor/U.S. Census Bureau (http://labor.alaska.gov/research/pop/popest.htm)

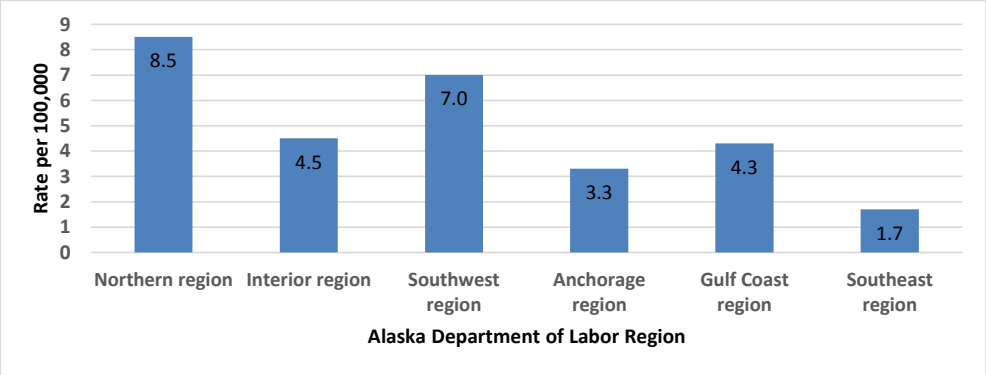


Figure 3. *Annual dog bite hospitalization rates by Alaskan regions per 100,000 people, 2001-2011 (ATR, 2013b).*

Over 90% of hospitalizations were not work related (98.3%) and without alcohol (94.9%) or recreational drug involvement (98.6%).

The majority of hospitalized dog bite victims were White (176, 60.3%), followed by Alaska Native (99, 33.9%), Black (5, 1.7%), Asian (2, 0.7%), and American Indian (1, 0.3%). The ethnicity of nine victims (3.1%) was unknown (Figure 4 and Table A-7, Appendix A).

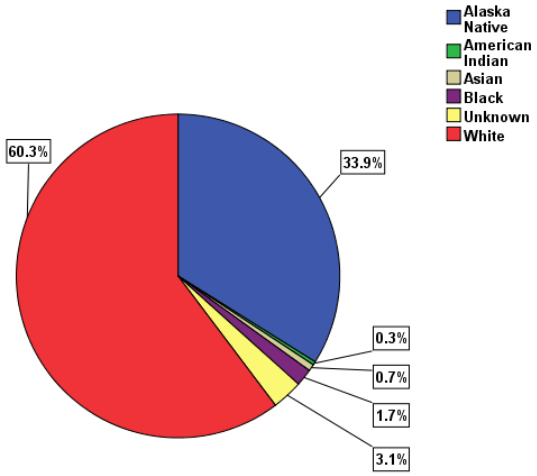


Figure 4. *Dog bite victims by race, 2001-2011 (ATR, 2013b).*

Dog bite hospitalizations by Alaska Natives comprised 34.6% of total hospital stays with known length (92 of 266 days total) compared to 65.4% for Non-Alaska Native victims (174 of 266). However, Alaska Native victims had longer average hospital stays (3.74 days) compared to Non-Alaska Native victims (2.36 days) (Table A-8, Appendix A). The average annual hospitalization rate for Alaska Natives was 7.2/100,000 people, compared to the rate for non-Alaska Native victims of 2.8/100,000 (Table A-9, Appendix A).

Of dog bite injuries with known locations that resulted in hospitalization, 128 (43.8%) were classified as occurring at "home." Cases with "unknown" locations accounted for 70 (24%) injuries; injuries in places for recreation and sport were three (1%), street/highway eight (2.7%), public place six (2.1%), industrial two (.7%), and 75 (25.7%) took place at "other" (Table A-11, Appendix A). After recoding the "place of

injuries" (E code, ICD-9-CM) to match the narrative description (explained in Methods section) the data yielded 182 (62.3%) injuries occurring on "home" premises, including victim's home, caregiver home, relative's or neighbor's home, and adjacent yard or walkway. Cases with "unknown" location then accounted for 66 (22.5%), places for recreation and sport were 15 (6.1%), street/highway 12 (4.6%), public building five (1.7%), and "other" (including river, forest, and lake) 12 (4.6%).

Based on AIS scores for 292 total cases, 246 injuries (84.2%) were minor, 25 moderate (8.6%), 15 serious (5.1%), and one critical (fatal) (0.3%), and five cases (1.7%) contained insufficient data (Table B-1, Appendix B). As mentioned above, one critical case resulted in a fatality (six year old female, 0.3%), and two cases resulted in traumatic amputations (0.7%): (a) one thumb amputation (ICD-M code 885; 67 year old male reported as moderate) and (b) one partial or complete hand amputation (ICD-M code 887; two year old male reported as serious).

A length of hospital stay of one to two days was most common in all AIS types (minor, moderate, serious, critical), especially for minor injuries (Figure 5 and Table B-2, Appendix B). Out of 266 cases with known length of stay, 104 one day stays involved 93 minor injuries (35%), seven moderate (2.6%), and three serious (1.1%); one case had insufficient AIS data. Out of 57 cases with two-day stays, 46 involved minor injuries (17.3%), five moderate (1.9%), three serious (1.1%), and one critical (0.4%); two cases (0.8%) had insufficient AIS data.

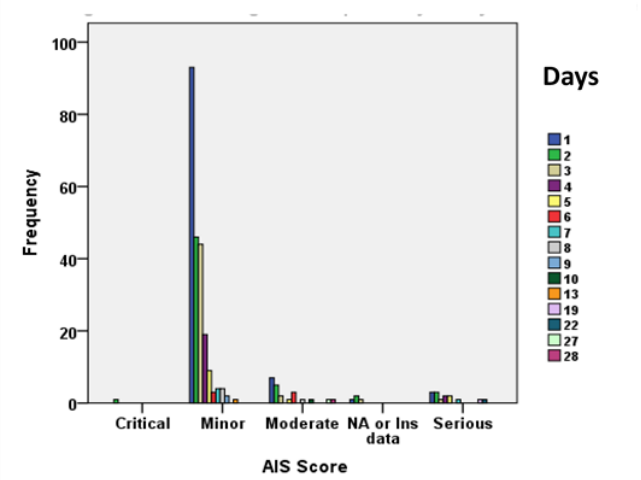


Figure 5. *Dog bite victim hospitalizations: Length of stay and "threat to life" score Abbreviated Injury Scale (AIS), 2001-2011 (ATR, 2013b).*

Out of 246 minor injuries resulting in hospitalization, 146 (59.3%) occurred to Whites, 85 (34.6%) to Alaska Natives, five (2.0%) to Blacks, two (0.8%) to Asians, and one (0.4%) to American Indians; in seven cases (2.8%) race was unknown. Out of 25 moderate injuries, 17 (68%) occurred to Whites and eight (32%) to Alaska Natives. Out of 15 serious injuries, 10 (66.7%) occurred to Whites, four (26.7%) to Alaska Natives, and one was unknown (Table B-3, Appendix B).

Out of 246 minor injuries, nearly half (121 or 49.2%) occurred to minors (0 to 19 years old): 54 (22%) were 0 to 4 years old; 38 (15.4%) were 5 to 9 years old; and 29 (11.8%) were 10 to 19 years old. For injuries to non-minors, 41 (16.7%) were 20 to 39 years old; 59 (24%) were 40 to 59 years old; and 25 (10.2%) were 60 and older. Similar age patterns were observed for moderate and serious injuries: of the total 25 moderate injuries 14 victims (56%) were 0 to 19 years old, and of the total 15 serious injuries nine victims (60%) were 0 to 19 years old (Table B-4, Appendix B).

The most common minor injuries were open wound of head/neck/face (101 cases or 34.6%) and open wound of upper limb/s (103 cases or 35.3%), which combine to 69.9% of all minor injuries (Table B-5, Appendix B).

Based on ICD-M coding, the most common injury was an open wound of head/neck/face 110 injuries or 37.7% of the first ICD-M code and 66 injuries or 22.6% of the second code. Open wound of upper limb/s was 105 injuries or 36% for the first ICD-M code and 87 injuries or 29.8% for the second code. Other categories showed smaller percentages: (a) fracture of upper limb/s was 9.9% for the first code and 1.7% for the second code; and (b) fracture of lower limb/s was 0.7% for the first code and 0.3% for the second code (Table B-6, Appendix B).

The average age of dog bite victims with an open wound of head/neck/face was 12 years for females and 10 years for male. The average age of victims with open wound of upper limb/s was 47 years for females and 36 years for males. Average age for all other types of injuries ranged between 20 and 35 years (Table B-7, Appendix B).

For dog bite victims with open wound of head/neck/face, 77 (70%) were 0 to 9 year old: 48 (43.6%) were 0 to 4 years old, and 29 (26.4%) were 5 to 9 year old. As age of the victims increased, the frequency of open wound of head/neck/face decreased; however, the frequency of open wound of upper limb/s increased with age (Figure 6 and Table C-1, Appendix C). Only 8 (7.7%) open wounds of upper limb/s were reported for victims 0 to 9 years old, while 21 such injuries (20%) were reported for victims 20 to 39 years old, and 43 (41%) were reported for victims 40 to 59 years old.

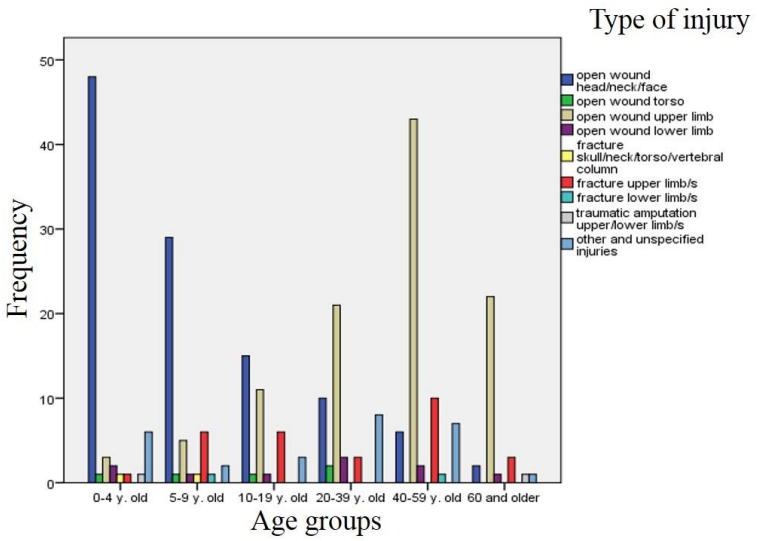


Figure 6. *Dog bite hospitalizations: Type of injury by age groups, 2001-2011 (ATR, 2013b).*

Approximately 70% of both male and female dog bite victims with open wound of the head/neck/face were 0 to 9 years old. In contrast, for open wound of upper limb/s, only 9.4% of males and 4.9% of females were 0 to 9 years old; 31.3% of males and 56.1% of females were 40 to 59 years old (Table D-1, Appendix D).

Narratives of circumstances as recorded by health care providers revealed that children were bitten more often by "known" dogs such as household pets or a relative's or friend's dog while adults were distracted with conversation. Teasing a dog and interfering with a dog's food or toys were common triggers, followed by playing in a yard and reaching for a dog in a doghouse. Less common incidents involving children happened outdoors with an unknown, unleashed dog; for adults, incidents often happened while walking their own pet and trying to break up a dogfight with another, unknown dog.

Data from various Alaskan animal control and governmental entities. Dog bite injuries recorded by ATR, which only captures hospitalizations, represented a small portion of the total dog bite burden. Figures 8 and 9 show dog bite records by various local entities throughout Alaska. Figure 9 excludes data from FNSB and MOA to allow closer examination of the data from areas with fewer recorded dog bites. Reporting local governmental entities ranged from borough level to an individual community entity such as police or animal control department. Governmental entities that responded to the data request for this study covered 64.7% of Alaska's 2010 Census population of 710,231 people. In this population, there were 8,942 dog bites recorded during 2002 to 2012 (Tables H-1 and H-2, Appendix H).

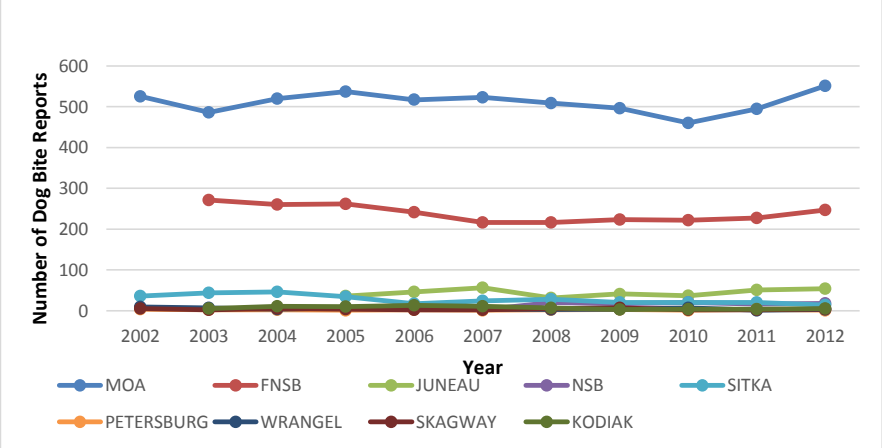


Figure 7. *Reported dog bites by Alaskan entities, 2002-2012. (State of Alaska Department of Health and Human Services SOE, 2013a)*

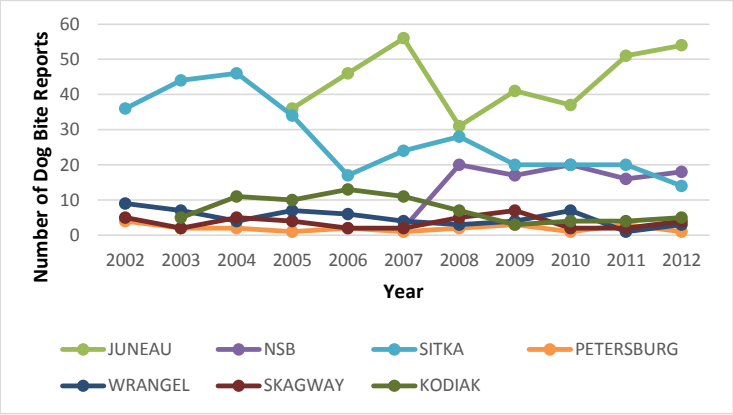


Figure 8. *Reported dog bites by Alaskan entities, excluding Municipality of Anchorage (MOA) and Fairbanks Northstar Borough (FNSB), 2002-2012 (State of Alaska Department of Health and Human Services SOE, 2013a)*

Reported numbers may not imply a higher or lower dog bite burden in a particular region compared to another as results were based solely on those areas that had records and could access those records. Thus, results should be interpreted with caution. There was, however, value in looking at the number of total dog bites within each region and how that is changing over time. Using the consistent data that was available, the statewide dog bite prevalence rate during 2007 to 2012 (according to the 64.7% of Alaska's population covered in the study) was 180 per 100,000 (Table 3).

Table 3
Annual Rate of Dog Bites by Region, 2007-2012

Alaska regions	Included population, 2010 Census[a]	Reported number of dog bites, 2007-2012	Prevalence rate, 2007-2012 per 100,000
Northern (North Slope Borough)	9,430	93	164
Interior (FNSB)	97,581	1,351	231
Anchorage (MOA)	291,826	3,034	190
Gulf Coast (Kodiak)	13,592	34	42
Southeast (Skagway, Petersburg, Sitka, Wrangell, Juneau)	47,308	451	159
Southwest (data unavailable)	--	--	--
Statewide Total	459,737	4,963	180

a Figures from US Census Bureau 2010.

Note: Source: [a]Annual Estimate by Alaska Department of Labor/U.S. Census Bureau (http;//labor.alaska.gov/research/pop/popest/htm)

(State of Alaska Department of Health and Human Services SOE, 2013a)

The areas with the highest annual prevalence rate were the Interior (231/100,000 people) and Anchorage (190/100,000). Close behind was the Northern region (164/100,000) and Southeast (159/100,000). The lowest rate was recorded in Gulf Coast (42/100,000); however, the Kodiak Borough (covering only a small island) was the only entity reporting data for this region. No data were available from the Southwest.

4.2 Discussion

This study's time period (2001 to 2011 for ATR) and the number of dog bite victims recorded by the ATR (292) were similar to those of the study conducted by Castrodale (2007) for 1991 to 2002, which had a total of 288 ATR cases. The proportion

of male victims was greater than female victims in both studies (56.2% in this study, 57% in Castrodale) versus females (43.8% and 43%). The male/female ratio of dog bite victims was slightly higher than the overall Alaska population trend (male/female ratio of 107 to100). With known race, both studies also documented more non-Alaska Native victims (64.7% in this study to 60% by Castrodale) than Alaska Native (35.3% in this study to 40% by Castrodale). Alaska Native victims were overrepresented compared to the overall Alaska population trend (non-Alaska Native/Alaska Native estimated population ratio of 4.9 to 1) (U.S. Census Bureau 2010).

The average annual hospitalization rate due to dog bite calculated in this study (3.9/100,000 people) had not changed since the last decade (Castrodale rate 3.9/100,000) (Castrodale, 2007b) and was slightly higher than the national rate of 3.1/100,000 for 2008 (Holmquist & Elixhauser, 2010).

The average annual hospitalization rate for non-Alaska Natives (all ages) compared to Alaska Native victims was 2.8 vs. 7.2/100,000 people, compared to the previous rate of 2.8 vs. 9.3/100,000, in which rates for non-Alaska Native victims remained the same (Castrodale, 2007a).

As shown in Table 4, annual hospitalization rates by age group were highest for children in both studies, however, rates were slightly lower in this study for 0 to 4 year old victims (11.3 vs.15.2/100,000 people); for 5 to 9 year olds rates remained the same (8.7/100,000); and the rate for 10 to 14 year olds was slightly higher (4.5 vs. 3.5/100,000), as were rates for 15 to 19 year olds (2.0 vs. 1.5/ 100,000). For adult victims, rates remained similar, except for the 40 to 49 year old group, in which the annual hospitalization rate increased (3.1 vs.1.3/100,000 (Castrodale, 2007b).

Table 4
Dog Bite Annual Hospitalization Rates by Age Groups for 2001-2011 and 1991-2011 Time Frames

Age group (years)	Annual rate per 100,000 Alaska population, 2001-2011	Annual rate per 100,000 Alaska population, 1991-2011
0-4	11.3	15.2
5-9	8.7	8.7
10-14	4.5	3.5
15-19	2.0	1.5
20-29	1.7	1.9
30-39	2.8	2.2
40-49	3.1	1.3
50-59	2.9	2.6
60+	3.5	3.7
Average annual rate	3.9	3.9

Note: Source: ATR, 2013b.

For 2001 to 2011, the annual hospitalization rate for Alaska Native victims less than 20 years old (12/100,000 people) (Table A-9, Appendix A) was almost twice as high as the rate for 2001 to 2008 (6.1/100,000) and almost four times higher than the corresponding overall U.S. rate for AI/ANs (3.1/100,000 (Bjork et al., 2013). As shown in Table 5, non-Native Alaska children less than 20 years old (4.9/100,000) and U.S. AI/AN victims of the same age group (6.5/100,000) had higher rates than the AI/AN nationwide population age less than 20 years old (3.4/100,000) and the U.S. general population of all ages (3.1/100,000) (Bjork et al., 2013).

Table 5
Summary of Annual and Average Dog Bite Hospitalization Rates by Age Group

Age group (years)	Annual rate per 100,000 Alaska population, 2001-2011 (ATR)	Annual rate per 100,000 Alaska population, 1991-2001 (ATR)	Annual rate per 100,000 AI/AN age <20 years, 2001-2008, nationwide	Annual rate per 100,000 general U.S. population, 2001-2008
0-4	11.3	15.2	5.2	4.9
5-9	8.7	8.7	4.3	3.9
10-14	4.5	3.5	2.4	2.4
15-19	2.0	1.5	2.0	1.3
Total 0-19 average annual rate	6.5	--	3.4	3.1

Note: Source: ATR 2013b, Castrodale,2007b and Bjork et al., 2013.

Hospitalization rates for children less than five years old were consistently the highest in the results of previous research and the present study. The rate for Alaskan children less than 5 years during 2001 to 2011 was 11.3/100,000 people and during 1991 to 2001 was 15.2/100,000; overall rates for AI/AN children in the U.S. were 5.2/100,000 (2001 to 2011) and 4.9/100,000 (1991 to 2001). The hospitalization rate for Alaskan AI/AN children < 20 years old was 6.1/100,000 people and the rate for outpatient visits was 596.4/100,000 (Bjork et al., 2013). This meant outpatient visits occurred at the rate of 98 to one hospitalization due to dog bite. Based on this ratio and the hospitalization rate for children < 20 years old in this study (6.5/100,000), the outpatient visit rate due to dog bite in Alaska could be estimated at 647/100,000 people.

The average length of hospital stay (2.8 days) for this study was slightly less than the national average (3.3 days) (Holmquist and Elixhauser, 2010). Alaska Native victims

had longer average hospital stays (3.7 days) compared to non-Alaska Native victims (2.4 days), which was similar to the previous study (4.6 and 2.5 days, respectively) (Castrodale, 2007b).

The Northern and Southwest Alaska regions had the highest annual dog bite hospitalization rates in both the current (2001-2011) and previous (1991-2001) studies. The Northern Alaska region had a rate of 8.5/100,000 people in the recent study versus 9.4/100,000 in the 1991-2001 study. The Southwest Alaska region had a rate of 9.4/100,000 in the recent study versus 10.4/100,000 in the 1991-2001 study (Castrodale 2007b). The Southeast consistently had the lowest hospitalization rate in studies for both time periods (1.7/100,000 and 1.9/100,000, respectively). Rates for the Interior and Anchorage were similar (4.5 vs. 4.6/100,000 and 3.3 vs. 3.1/100,000, respectively). The Gulf Coast had a current rate higher than the previously reported one (4.3 vs. 2.9/100,000). The average annual rate of dog bite injury hospitalizations with known region was 3.8/100,000, consistent with the previous rate of 3.9/100,000 (Castrodale, 2007b.)

4.3 Summary

The majority of dog bite injuries (84%) were minor, with a length of hospital stay of 1 to 2 days. The most common injuries requiring hospitalization were open wounds of the head/neck/face and open wound of upper limb/s; combined, these categories comprised almost 70% of all minor injuries, which were consistent with previous findings. In relation to type of injury and age group, young children hospitalized for a dog bite injury were mostly affected by open wound of head/neck/face, while hospitalized adults were mostly affected by open wound of upper limb/s. Of hospitalized

victims with open wound of head/neck/face, 77 (70%) were 0 to 9 year olds, with males and females showing similar patterns. As age increased, the frequency of head/neck/face injuries decreased, and the frequency of open wounds of upper limb/s increased, which was also observed in previous studies. By race, a majority (64.7%) of dog bite victims were non-Alaskan Native people compared to Alaska Native people (35.3%).

Results of this study were consistent with those of previous studies regarding both Alaskan and national data in that young children were disproportionally affected by dog bite injuries (Gilchrist et al., 2008; Castrodale, 2007b; Bjork et al., 2013; Holmquist and Elixhauser, 2010). Out of 246 minor injuries, nearly half (121 or 49.2%) occurred to victims 0 to 19 years old. A similar age pattern was observed for moderate and serious injuries.

Data from Alaskan entities showed high rates of dog bite prevalence statewide (180/100,000 people); the Interior and Northern regions had the highest rates of all reported bites. The overall number of reported dog bites from 2002-2012 was 8,942, a large number, particularly considering data were missing from many nonreporting communities. Alaska Trauma Registry data recorded only 292 hospitalizations, a small portion of the dog bites in Alaska. However, the ATR data were consistent with previous studies and could be statistically analyzed. Results of this study suggested that Alaskan dog bites were underreported and the overall dog bite health burden was higher than previously described.

Limitations of the study. The ATR dataset collected for this study did not contain data regarding rabies vaccination or testing; therefore, data were not useful for tracking rabies exposure. The ATR data did not have information regarding emergency

department visits so emergency department visit rates could not be calculated and compared with the previous study. Detailed narratives of the circumstances of dog bite incidents were not provided by the local reporting entities, so valid information regarding attacking dog (breed, age, ownership, and vaccination status) could not be analyzed.

In the dataset from Alaskan governmental entities (animal control, local police department, and borough governments), details such as gender, age, location of victim, and rabies vaccination were inconsistent and partially completed. The one piece of consistent data throughout these responses was that the dog bite incidents had gained government or animal control attention. Therefore, from data provided by Alaskan governmental entities, only assumptions could be made regarding the state's overall dog bite burden.

The population covered in this portion of the study was 64.7% of the total Alaskan population. Data were weighted towards urban areas since all major urban areas in Alaska except the Matanuska-Susitna Borough contributed data to this report. While many rural areas were covered by data from local rural communities and larger boroughs (North Slope and FNSB), the Northern and Gulf Coast areas of rural Alaska were under-represented, and the Southwest region was not represented at all.

Some entities did not provide data for all years of the study. All reporting entities did, however, provide consistent data from 2007 to 2012; therefore, the researcher analyzed that period. Urban and rural comparisons within this report were not possible due to lack of data regarding location of the dog bite incidents. For example, a report in FNSB records might have been for the urban center of Fairbanks or from a small rural community outside the city. Further, if additional reporting from missing rural areas and

the Mat-Su Borough had been available, the total number of bites would be higher. Reports from local entities and ATR might overlap for the period of the study, therefore ATR data were not used in the statewide entity portion of the analysis.

Barriers were encountered during the attempt to collect data from the various statewide entities. Some communities had no tracking records regarding dog bites at all, while other communities did keep records, but they had been lost or destroyed due to insufficient organization resources or computer issues. Some entities were understaffed, had more critical things to focus on, and/or could not commit the time to review previous year's records even though the request for data took place over many months. In two circumstances the boroughs wanted to receive payment for gathering the information. One of those also required three months advance notice before approval of the project and release of their data, and then three more months after the project was completed for their (the entities') approval of the researcher's results.

The researcher attempted to contact several state departments of health and social services outside Alaska to inquire about the process of record keeping and data collection regarding tracking dog bites in their respective states. In all of the states contacted, there was no centralized database of dog bite records. Contacted states included New York, Nevada, California, Wisconsin, and Minnesota. Internet research and a literature review did not find any existing model in the U.S. for the collection of dog bite data.

Chapter 5 Conclusions and Recommendations

This chapter presents conclusions drawn from this study and recommendations for future use of the data herein.

5.1 Conclusions

The majority of dog bites in Alaska are underreported, and the dog bite health burden is higher in Alaska than described in any previous report. Alaska Trauma Registry records capture only a small portion of dog bite injuries. Results are consistent with previous studies in that young children 0 to 9 years of age and the Alaska Native population are disproportionally affected by dog bite injuries. Adding a qualitative approach for future studies could improve the understanding of why dog bites happen and what aspects of the human/dog relationship can be studied for developing effective strategies of dog bite prevention.

Areas of concern include the lack of adequate recordkeeping in general, as well as the absence of documentation regarding rabies vaccination status of the attacking dog(s) in many communities. Some communities have relatively thorough records, indicating whether or not the dog was licensed and vaccinated. Some communities also record that the responding officer asked these important questions. However, the majority of Alaskan entities are not able to retrieve accurate information regarding dog licensing, breed, and rabies vaccination status which limits scientific analysis. Overall, data remain unreported or unanalyzed due to poor record keeping or lack of resources.

5.2 Recommendations

Dog bite injuries have both tangible and intangible costs to our communities. Tangible costs include health consequences and financial burden. Intangible costs are less

easily quantified, but are still important, including the time and effort of professionals and others who work on issues related to dog bite injury, social conflicts between dog owners and the general public, and increased cost of homeowners' insurance. Since these issues affect not only individuals and families but also quality of life in a community, dog bite prevention is worth attention from public health officials, medical professionals, educators, caregivers, and other stakeholders.

The size of Alaska and modes of transportation and access for many rural communities create unique issues and circumstances regarding dog bite medical response and prevention. In many rural areas, access to health care may be unavailable or limited to the service level of a local clinic. Serious injury cases must be transported to a regional hub or urban center for advanced treatment and rehabilitation. Since young children and Native Alaskans are disproportionally affected by dog bites, airlifting rural children and their guardians for treatment may result in high financial and emotional cost.

Alaska has a lack of clear and uniform procedures for reporting and tracking dog bites that are either treated on an outpatient basis by local health care providers, or bites that are reported to local police departments and animal control officers. This lack of reporting contributes to an "under the radar" aspect of this issue.

Community and state-level recommendations. In Alaska, dog bite incident and injury tracking are either lacking at the community level, not uniformly recorded, or not properly stored. Consistent measurement and analysis of injury trends would be improved by adoption, at the state level, of a standardized form and process for reporting dog bite injuries. Accurate and complete data collection would help quantify identified dog bite health disparities, such as those between rural and urban areas, and Alaska Native and

Non-Alaska Native populations. Tracking of rabies vaccinations and dog licensing for attacking dogs is an important issue that needs to be addressed. Public health officials should encourage victim reporting by raising the awareness of the general public and other stakeholders (medical providers, animal control officials, police departments).

The State of Alaska should consider sponsoring a standardized information request form. In 2001, the AVMA Task Force on Canine Aggression and Human-Canine Interactions proposed a lengthy standard information request form to address the data collection issue. However, the researcher's experience of trying to gather statewide data from overworked public servants provides evidence that they are unlikely to respond to requests for extensive recordkeeping. "Short and simple" would be a best practice in this situation. The researcher's recommended form is significantly shorter than the AVMA model form and would not require more than a minute to fill out (Appendix I).

Actions that would assist in moving towards a more thorough reporting process for dog bites could begin with thanking the agencies that participated in this study, sharing the results, and encouraging the dissemination of the results to other local officials, who might be concerned about this issue or open to learning more. A subsequent request could be made (sample request letter Appendix G) that they adopt the simple standardized form for reporting and tracking dog bite injuries (Appendix I), and submit this form to the Section of Epidemiology.

The second step in the process would be to reach out to those areas that either did not participate in the study or that put up barriers to participation, such as charging for data or long lead times for access. Offers could be made to share the completed study with them for their review and thoughts. Primary points of communication might include:

that 64.7% of Alaska's population was covered in the study and that by increasing participation from Mat-Su and missing rural areas the resulting data would be very useful, help to identify areas for intervention, and possibly set a standard for other states to follow. In the future the adoption of electronic medical record keeping could help address the lack of information regarding dog bite injuries.

***Prevention/education*.** Efforts to create guidelines for educational and public awareness campaigns to prevent dog bites have been made by AVMA, CDC, the American Association of Pediatrics (AAP) and the National Canine Research Council. National Dog Bite Prevention Week is an annual AVMA event held the third week of May. The timing was chosen to emphasize increased risk to children during summer months from higher interaction with dogs caused by the increase of outdoor activities and time at home during school vacation. The AVMA recommends a one-hour school-wide assembly for elementary students with presentations from a health care professional and animal worker.

Additional educational efforts should address the disproportion of child victims by educating caregivers, early childhood development workers, teachers, and pediatricians regarding the high risk of dog bites for children and prevention strategies. Animal control personnel, veterinarians, and health care workers all interact with dog owners and encounter dog bite victims (or in the case of veterinarians they may learn of a dog that has attacked either a person or another animal). Educational efforts at the elementary school level could potentially have the greatest impact on avoiding dog bite injuries for children.

For the high-risk group of seniors, educational efforts should target family and other caregivers, medical professionals, and community organizations interacting with the elderly.

Effective educational pathways should be tailored to Alaska specific needs. Rural residents need an improved level of caution and awareness of safe procedures for interacting with dogs. Rural uses of dogs include transportation via dog sled, subsistence hunting in winter, racing sled dog teams for recreation, and regular domestic pet ownership. These rural practices create interaction between children and the elderly with known and unknown dogs. Unlike urban areas with strict zoning, rural areas have open-air dog kennels, "dog yards" with large numbers of dogs, sled dog training, and dog holding areas.

***Prevention/model local ordinances*.** The 2001 AVMA Task Force on Canine Aggression and Human-Canine Interactions also proposed a model dog and cat control ordinance described as "Originally produced and published jointly by the American Veterinary Medical Association, the American Humane Association, the Humane Society of the United States, and the Pet Food Institute in 1976. Modifications have been made from the original version to reflect updated US Public Laws, current titles of other referenced documents, and present favored terminology and definitions concerning 'dangerous' animals." (AVMA Task Force, 2001). Alaskan communities could have an impact on prevention locally by reviewing and updating local animal control ordinances, particularly regarding animal control issues that are relatively unique to Alaska.

***Prevention/legislation*.** Current discussion regarding dog bite legislation at the state or federal level generally revolves around issues of banning or limiting specific dog

breeds compared to the more neutral “dangerous animal” approach (AVMA, 2012). Attempting to ban specific breeds is controversial and legally difficult, but many communities across the United States have banned pit bulls and other breeds. The “dangerous animal” approach punishes only those individual dogs and owners who violate the rules of behavior.

Family-level recommendations. Since children, especially young boys, are disproportionally affected by dog bites, families should educate their children on prevention. A good starting place is dog bite prevention guidelines published by AVMA, U.S. Postal Service, and AAP. Following is an example from AVMA (www.avma.org)

Important dog bite prevention tips include:

- “Pick a dog that is good match for your home. Consult your veterinarian for details.
- Socialize your pet. Gradually expose your puppy to a variety of people and other animals so it feels at ease in these situations; continue this exposure as your dog gets older.
- Train your dog. Commands can build a bond of obedience and trust between the dog and the owner. Avoid aggressive games with your dog.
- Vaccinate your dog against rabies and other diseases.
- Neuter or spay your dog. These dogs are less likely to bite.
- Never leave a baby or small child alone with a dog.
- Teach your child to ask a dog owner for permission before petting any dog.
- Let a strange dog sniff you or your child before touching it, and pet it gently, avoiding the face and tail.

- Never bother a dog if it is sleeping, eating, or caring for puppies.
- Do not run past a dog.
- If a dog threatens you, remain calm. Avoid eye contact. Stand still or back away slowly until the dog leaves. If you are knocked down, curl into a ball and protect your face with your arms and fists.

When placing a small child in a daycare program or neighbor's or relative's home, be alert to the presence of dogs and how they are confined and cared for. Families should become aware of the issues involved in interacting with multiple dogs, dog yards, sled dog runs, and other dog training areas."

The American Society for the Prevention of Cruelty to Animals publishes an extensive list titled "Recommendations for Parents" (Appendix E) and "Recommendations for Pet Guardians" (Appendix F).

Individual-level recommendations. Individuals can have a major impact on their own likelihood of being bitten and on the chances of their family or associates being injured by a dog. It is important to become familiarized with how to recognize and avoid dangerous situations with dogs; plan and practice how to respond if attacked by an unknown dog; and how to interfere with dog fights, especially for dog owners (Appendix E). Children should discuss and follow the basic rules of dog safety and should be encouraged to report any incidents or run-ins with strange dogs to their parents or school officials. Seniors should be alert to issues of dog and animal safety and practice safe pet stewardship when around dogs.

Recommendations for Future Work. There is a need for qualitative studies focusing on human behavior triggering dog bites, interactions with dogs, dog ownership, dog breeds versus dangerous animals, and unique Alaska-specific dog issues.

It is important to address the lack of detection of unreported dog bites, inconsistent/incomplete documentation of reported dog bites, and to assist in developing an accurate injury pyramid of this public health issue. The largest number of bites occurs to children, therefore it is recommended to conduct an anonymous survey of high risk populations (elementary school children) regarding dog bite injuries, their exposure to potential injury through being in the vicinity of dogs, and their awareness of ways to prevent bites from occurring.

A future study could review the actual costs of responding to and treating dog bite injuries in Alaska and compare this to the cost in the rest of the U.S.

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Appendix A

Alaska Trauma Registry Results

Table A-1

Frequency and Percentage of Dog Bite Hospitalizations by Year, ATR 2001-2011.

Year	Frequency	Percent
2001	28	9.6
2002	33	11.3
2003	30	10.3
2004	30	10.3
2005	27	9.2
2006	28	9.6
2007	29	9.9
2008	22	7.5
2009	12	4.1
2010	33	11.3
2011	20	6.8
Total	292	100.0

Note: Source: ATR, 2013b.

Table A-2
Hospitalization Annual Rates Due to Dog Bite, ATR 2001-2011.

Year	Hospitalization frequency	Alaska population, annual estimate	Hospitalization rate per 100,000
2001	28	633,630	4.42
2002	33	643,786	5.13
2003	30	647,884	4.63
2004	30	657,483	4.56
2005	27	664,334	4.06
2006	28	671,202	4.17
2007	29	676,056	4.29
2008	22	681,997	3.23
2009	12	692,314	1.73
2010	33	710,231	4.65

2011	20	723,136	2.77
Total	292	7,402,033	3.94

Table A-3

Annual Rates of Dog Bite Hospitalizations by Age Group, ATR 2001-2011.

Age-group (years)	# of hospital visits (% of all injuries)	July 2007 population estimate[a]	Annual rate per 100,000[a]
0-4	63 (21.6)	50,588	11.3
5-9	46 (15.8)	48,023	8.7
10-14	26 (8.9)	52,379	4.5
15-19	12 (4.1)	55,635	2.0
20-29	18 (6.2)	97,766	1.7
30-39	29 (9.9)	92,499	2.8
40-49	37 (12.7)	108,573	3.1
50-59	32 (11.0)	99,340	2.9
60+	29 (9.9)	76,177	3.5
Total	292	680,169	Average 3.9

Note: Source: ATR, 2013b.

[a]July 2007 estimate. Annual Estimate by Alaska Department of Labor/U.S. Census Bureau (http://labor.alaska.gov/research/pop/popest.htm)

Table A-4

Total Hospital Stay Statistics, ATR 2001-2011.

Statistics

Total_HospD total hospital days

N	Valid	266
	Missing	26
Mean		2.8346
Std. Deviation		3.26948
Range		27.00
Minimum		1.00
Maximum		28.00
Sum		754.00

Note: Source: ATR, 2013b.

Table A-5

Length of Hospital Stay for Dog Bite Hospitalizations, ATR 2001-2011.

Total number of days in hospital	Frequency	Percent
1	104	35.6
2	57	19.5
3	48	16.4
4	21	7.2
5	12	4.1
6	6	2.1
7	5	1.7
8	5	1.7
9	2	0.7
10	1	0.3
13	1	0.3
19	1	0.3
22	1	0.3
27	1	0.3
28	1	0.3
Total	266	90.8
Missing value	26	9.2
Total	292	100.0

Note: Source: ATR, 2013b.

Table A-6

Hospitalized Dog Bite Victims by Gender, ATR 2001-2011.

Gender	Frequency	Percent
Female	128	43.8
Male	164	56.2
Total	292	100.0

Note: Source: ATR, 2013b.

Table A-7
Hospitalized Dog Bite Victims by Race, ATR 2001-2011.

Race	Frequency	Percent
Alaska Native	99	33.9
American Indian	1	0.3
Asian	2	0.7
Black	5	1.7
Unknown	9	3.1
White	176	60.3
Total	292	100.0
Total AN/AI versus Non-AN/AI		
Alaska Native/AI	100	35.3
Non-Alaska Native/AI	183	64.7

Note: Source: ATR, 2013b.

Table A-8
Hospitalization Days by Alaska Native and non-Alaska Native Race and Length of Stay, ATR 2001-2011.

# of days in hospital	Alaska Native, frequency (admissions)	Alaska Native, total days	Non-Alaska Native, frequency	Non-Alaska Native, total days
1	26	26	78	78
2	16	32	41	82
3	18	54	30	90
4	11	44	10	40
5	8	40	4	20
6	3	18	3	18
7	2	14	3	21
8	2	16	3	24
9	2	18	0	0
10	0	0	1	10
13	1	13	0	0
19	1	19	0	0
22	1	22	0	0
27	0	0	1	27
28	1	28	0	0
Total 754	92 (34.6%)	344	174 (65.4%)	410
Mean		3.74		2.36

Note. Numbers based on Table A-10 (total of 266 cases with known length of stay). Source: ATR, 2013b.

Table A-9

Dog Bite Hospitalization Annual Rates by Alaska Native and non-Alaska Native Race and Age Groups, ATR 2001-2011.

Age group (years)	# of hospital visits (% of all injuries)	July 2007 population estimate*	Annual rate per 100,000 for 2001-2011	Annual rate per 100,000 for 1991-2001
Age 0- 19 years				
AI/AN 0-19 y.old	63	47,727	12.0	
Non-AI/AN 0-19 y.old	84	159,195	4.9	
Total	147	206,925	6.5	
AK AN/AI, all ages	92	115,421	7.2	9.3
Non-Native, all ages	174	564,748	2.8	2.8

Note: Source: ATR, 2013b.

Table A-10: *Dog Bite Hospitalizations: Total Hospital Days and Race, ATR 2001-2011.*

Total_HospD total hospital days * RACE Crosstabulation

			RACE						
			Alaska Native	American Indian	Asian	Black	Unknown	White	Total
Total_HospD total hospital days	1.00	Count	26	1	1	4	5	67	104
		% within RACE	28.3%	100.0%	50.0%	80.0%	62.5%	42.4%	39.1%
		% of Total	9.8%	0.4%	0.4%	1.5%	1.9%	25.2%	39.1%
	2.00	Count	16	0	0	1	2	38	57
		% within RACE	17.4%	0.0%	0.0%	20.0%	25.0%	24.1%	21.4%
		% of Total	6.0%	0.0%	0.0%	0.4%	0.8%	14.3%	21.4%
	3.00	Count	18	0	1	0	1	28	48
		% within RACE	19.6%	0.0%	50.0%	0.0%	12.5%	17.7%	18.0%
		% of Total	6.8%	0.0%	0.4%	0.0%	0.4%	10.5%	18.0%
	4.00	Count	11	0	0	0	0	10	21
		% within RACE	12.0%	0.0%	0.0%	0.0%	0.0%	6.3%	7.9%
		% of Total	4.1%	0.0%	0.0%	0.0%	0.0%	3.8%	7.9%
	5.00	Count	8	0	0	0	0	4	12
		% within RACE	8.7%	0.0%	0.0%	0.0%	0.0%	2.5%	4.5%
		% of Total	3.0%	0.0%	0.0%	0.0%	0.0%	1.5%	4.5%
	6.00	Count	3	0	0	0	0	3	6
		% within RACE	3.3%	0.0%	0.0%	0.0%	0.0%	1.9%	2.3%
		% of Total	1.1%	0.0%	0.0%	0.0%	0.0%	1.1%	2.3%
	7.00	Count	2	0	0	0	0	3	5
		% within RACE	2.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.9%
		% of Total	0.8%	0.0%	0.0%	0.0%	0.0%	1.1%	1.9%
	8.00	Count	2	0	0	0	0	3	5
		% within RACE	2.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.9%
		% of Total	0.8%	0.0%	0.0%	0.0%	0.0%	1.1%	1.9%
	9.00	Count	2	0	0	0	0	0	2
		% within RACE	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
		% of Total	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
	10.00	Count	0	0	0	0	0	1	1
		% within RACE	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.4%
		% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	13.00	Count	1	0	0	0	0	0	1
		% within RACE	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
		% of Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	19.00	Count	1	0	0	0	0	0	1
		% within RACE	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
		% of Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	22.00	Count	1	0	0	0	0	0	1
		% within RACE	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
		% of Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	27.00	Count	0	0	0	0	0	1	1
		% within RACE	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.4%
		% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	28.00	Count	1	0	0	0	0	0	1
		% within RACE	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
		% of Total	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
Total		Count	92	1	2	5	8	158	266
		% within RACE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	34.6%	0.4%	0.8%	1.9%	3.0%	59.4%	100.0%

Note: Source: ATR, 2013b.

Table A-11
Dog Bite Hospitalizations: Injury Place, ATR 2001-2011.

INJPLACE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Highway	8	2.7	2.7	2.7
	Home	128	43.8	43.8	46.6
	Industrial P	2	.7	.7	47.3
	Other	75	25.7	25.7	72.9
	Public Place	6	2.1	2.1	75.0
	Recretion/Sp	3	1.0	1.0	76.0
	Unknown	70	24.0	24.0	100.0
	Total	292	100.0	100.0	

Note: Source: ATR, 2013b.

Appendix B

Alaska Trauma Registry Results

Table B-1
Dog Bite Hospitalizations and Threat to Life Score (AIS), ATR 2001-2011.

Threat to Life AIS Score	Frequency	Percent
Critical	1	0.3
Serious	15	5.1
Moderate	25	8.6
Minor	246	84.2
NA or Ins data	5	1.7
Total	292	100.0

Note: Source: ATR, 2013b.

Table B-2

Dog Bite Hospital Stay in Days and Threat to Life Score (AIS Score), ATR 2001-2011.

Dog bite victims: hospital stay in days and AIS score

			AIS score					
			Critical	Minor	Moderate	NA or Ins data	Serious	Total
Total_HospD total hospital days	1.00	Count	0	93	7	1	3	104
		% of Total	0.0%	35.0%	2.6%	0.4%	1.1%	39.1%
	2.00	Count	1	46	5	2	3	57
		% of Total	0.4%	17.3%	1.9%	0.8%	1.1%	21.4%
	3.00	Count	0	44	2	1	1	48
		% of Total	0.0%	16.5%	0.8%	0.4%	0.4%	18.0%
	4.00	Count	0	19	0	0	2	21
		% of Total	0.0%	7.1%	0.0%	0.0%	0.8%	7.9%
	5.00	Count	0	9	1	0	2	12
		% of Total	0.0%	3.4%	0.4%	0.0%	0.8%	4.5%
	6.00	Count	0	3	3	0	0	6
		% of Total	0.0%	1.1%	1.1%	0.0%	0.0%	2.3%
	7.00	Count	0	4	0	0	1	5
		% of Total	0.0%	1.5%	0.0%	0.0%	0.4%	1.9%
	8.00	Count	0	4	1	0	0	5
		% of Total	0.0%	1.5%	0.4%	0.0%	0.0%	1.9%
	9.00	Count	0	2	0	0	0	2
		% of Total	0.0%	0.8%	0.0%	0.0%	0.0%	0.8%
	10.00	Count	0	0	1	0	0	1
		% of Total	0.0%	0.0%	0.4%	0.0%	0.0%	0.4%
	13.00	Count	0	1	0	0	0	1
		% of Total	0.0%	0.4%	0.0%	0.0%	0.0%	0.4%
	19.00	Count	0	0	0	0	1	1
		% of Total	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	22.00	Count	0	0	0	0	1	1
		% of Total	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
	27.00	Count	0	0	1	0	0	1
		% of Total	0.0%	0.0%	0.4%	0.0%	0.0%	0.4%
	28.00	Count	0	0	1	0	0	1
		% of Total	0.0%	0.0%	0.4%	0.0%	0.0%	0.4%
Total		Count	1	225	22	4	14	266
		% of Total	0.4%	84.6%	8.3%	1.5%	5.3%	100.0%

Note: Source: ATR, 2013b.

Table B-3

Dog Bite Hospitalizations by Race and AIS Score, ATR 2001-2011.

RACE * AIS_TEXT Crosstabulation

			AIS_TEXT					
			Critical	Minor	Moderate	NA or Ins data	Serious	Total
RACE	Alaska Native	Count	0	85	8	2	4	99
		% within AIS_TEXT	0.0%	34.6%	32.0%	40.0%	26.7%	33.9%
	American Indian	Count	0	1	0	0	0	1
		% within AIS_TEXT	0.0%	0.4%	0.0%	0.0%	0.0%	0.3%
	Asian	Count	0	2	0	0	0	2
		% within AIS_TEXT	0.0%	0.8%	0.0%	0.0%	0.0%	0.7%
	Black	Count	0	5	0	0	0	5
		% within AIS_TEXT	0.0%	2.0%	0.0%	0.0%	0.0%	1.7%
	Unknown	Count	0	7	0	1	1	9
		% within AIS_TEXT	0.0%	2.8%	0.0%	20.0%	6.7%	3.1%
	White	Count	1	146	17	2	10	176
		% within AIS_TEXT	100.0%	59.3%	68.0%	40.0%	66.7%	60.3%
Total		Count	1	246	25	5	15	292
		% within AIS_TEXT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Source: ATR, 2013b.

Table B-4

Dog Bite Hospitalizations by Age Group and AIS Score, ATR 2001-2011.

AgeGroup2 age group2 * AIS_TEXT Crosstabulation

			AIS_TEXT					
			Critical	Minor	Moderate	NA or Ins data	Serious	Total
AgeGroup2 age group2	1.00 0-4 y. old	Count	0	54	5	0	4	63
		% within AIS_TEXT	0.0%	22.0%	20.0%	0.0%	26.7%	21.6%
	2.00 5-9 y. old	Count	1	38	4	0	3	46
		% within AIS_TEXT	100.0%	15.4%	16.0%	0.0%	20.0%	15.8%
	3.00 10-19 y. old	Count	0	29	5	1	2	37
		% within AIS_TEXT	0.0%	11.8%	20.0%	20.0%	13.3%	12.7%
	4.00 20-39 y. old	Count	0	41	4	2	0	47
		% within AIS_TEXT	0.0%	16.7%	16.0%	40.0%	0.0%	16.1%
	5.00 40-59 y. old	Count	0	59	5	1	4	69
		% within AIS_TEXT	0.0%	24.0%	20.0%	20.0%	26.7%	23.6%
	6.00 60 and older	Count	0	25	2	1	2	30
		% within AIS_TEXT	0.0%	10.2%	8.0%	20.0%	13.3%	10.3%
Total		Count	1	246	25	5	15	292
		% within AIS_TEXT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Source: ATR, 2013b.

Table B-5

Dog Bite Hospitalizations: Type of Injuries and AIS Score, ATR 2001-2011.

Dog bite victims: types of injuries and "threat to life" score (AIS score) at the time of hospital admission

			Type of injuries									
			1.00 open wound head/neck/face	2.00 open wound torso	3.00 open wound upper limb	4.00 open wound lower limb	5.00 fracture skull/neck/torso/vertebral column	6.00 fracture upper limb/s	7.00 fracture lower limb/s	8.00 traumatic amputation upper/lower limb/s	9.00 other and unspecified injuries	Total
AIS_TEXT	Critical	Count	0	0	0	0	1	0	0	0	0	1
		% of Total	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%
	Minor	Count	101	5	103	9	0	11	0	0	17	246
		% of Total	34.6%	1.7%	35.3%	3.1%	0.0%	3.8%	0.0%	0.0%	5.8%	84.2%
	Moderate	Count	6	0	1	0	1	8	1	1	7	25
		% of Total	2.1%	0.0%	0.3%	0.0%	0.3%	2.7%	0.3%	0.3%	2.4%	8.6%
	NA or Ins data	Count	0	0	0	1	0	1	0	0	3	5
		% of Total	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%	0.0%	0.0%	1.0%	1.7%
	Serious	Count	3	0	1	0	0	9	1	1	0	15
		% of Total	1.0%	0.0%	0.3%	0.0%	0.0%	3.1%	0.3%	0.3%	0.0%	5.1%
Total		Count	110	5	105	10	2	29	2	2	27	292
		% of Total	37.7%	1.7%	36.0%	3.4%	0.7%	9.9%	0.7%	0.7%	9.2%	100.0%

Note: Source: ATR, 2013b.

Table B-6
Dog Bite Hospitalizations: Types of Injuries by Assigned ICD-M Code, ATR 2001-2011.

	First ICD-M code		Second ICD-M code	
Injury Categories	Frequency	Percent	Frequency	Percent
Open wound head/neck/face	110	37.7	66	22.6
Open wound of upper limb/s	105	36.0	87	29.8
Open wound lower limb/s	10	3.4	4	1.4
Open wound torso	5	1.7	5	1.7
Fracture upper limb/s	29	9.9	5	1.7
Fracture lower limb/s	2	0.7	1	0.3
Fracture skull/neck/torso/vertebral column	2	0.7	3	1.0
Other and unspecified injuries	27	9.2	26	8.9
Traumatic amputation upper/lower limb/s	2	0.7	0	0.0
No assigned code	0	0.0	95	32.5
Total	292	100.0	292	100.0

Note: Source: ATR, 2013b.

Table B-7

Dog Bite Hospitalizations: Type of Injuries and Average Age by Gender, ATR 2001-2011.

Average age of Female and Male dog bite victims by type of injuries

AGE

Type of injuries	Gender	Mean	Number of cases
1.00 open wound head/neck/face	Female	12.30	47
	Male	10.17	63
	Total	11.08	110
2.00 open wound torso	Female	20.50	2
	Male	16.33	3
	Total	18.00	5
3.00 open wound upper limb	Female	47.34	41
	Male	39.59	64
	Total	42.62	105
4.00 open wound lower limb	Female	38.20	5
	Male	19.40	5
	Total	28.80	10
5.00 fracture skull/neck/torso/vertebral column	Female	3.50	2
	Total	3.50	2
6.00 fracture upper limb/s	Female	31.06	16
	Male	32.62	13
	Total	31.76	29
7.00 fracture lower limb/s	Female	30.00	2
	Total	30.00	2
8.00 traumatic amputation upper/lower limb/s	Male	34.50	2
	Total	34.50	2
9.00 other and unspecified injuries	Female	30.08	13
	Male	22.64	14
	Total	26.22	27
Total	Female	28.95	128
	Male	25.19	164
	Total	26.84	292

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Note: Source: ATR, 2013b.

Table B-8
Dog Bite Hospitalizations by Age Groups, ATR 2001-2011.

Dog bite hospitalizations by age groups 2001-2011

Age groups	Frequency	Percent
1 0-4 years old	63	21.6
2 5-9 years old	46	15.8
3 10-14 years old	26	8.9
4 15-19 years old	12	4.1
5 20-29 years old	18	6.2
6 30-39 years old	29	9.9
7 40-49 years old	37	12.7
8 50-59 years old	32	11.0
9 60 and older	29	9.9
Total	292	100.0

Note: Source: ATR, 2013b.

Table B-9
Dog Bite Hospitalizations by Age Group and Race, ATR 2001-2011.

agegroups age groups * RACE Crosstabulation

			RACE						
			Alaska Native	American Indian	Asian	Black	Unknown	White	Total
agegroups age groups	1 0-4 years old	Count	26	0	0	1	3	33	63
		% within RACE	26.3%	0.0%	0.0%	20.0%	33.3%	18.8%	21.6%
		% of Total	8.9%	0.0%	0.0%	0.3%	1.0%	11.3%	21.6%
	2 5-9 years old	Count	24	0	0	1	0	21	46
		% within RACE	24.2%	0.0%	0.0%	20.0%	0.0%	11.9%	15.8%
		% of Total	8.2%	0.0%	0.0%	0.3%	0.0%	7.2%	15.8%
	3 10-14 years old	Count	9	0	1	0	2	14	26
		% within RACE	9.1%	0.0%	50.0%	0.0%	22.2%	8.0%	8.9%
		% of Total	3.1%	0.0%	0.3%	0.0%	0.7%	4.8%	8.9%
	4 15-19 years old	Count	4	0	0	0	1	7	12
		% within RACE	4.0%	0.0%	0.0%	0.0%	11.1%	4.0%	4.1%
		% of Total	1.4%	0.0%	0.0%	0.0%	0.3%	2.4%	4.1%
	5 20-29 years old	Count	5	1	0	1	0	11	18
		% within RACE	5.1%	100.0%	0.0%	20.0%	0.0%	6.3%	6.2%
		% of Total	1.7%	0.3%	0.0%	0.3%	0.0%	3.8%	6.2%
	6 30-39 years old	Count	11	0	1	0	2	15	29
		% within RACE	11.1%	0.0%	50.0%	0.0%	22.2%	8.5%	9.9%
		% of Total	3.8%	0.0%	0.3%	0.0%	0.7%	5.1%	9.9%
	7 40-49 years old	Count	11	0	0	0	0	26	37
		% within RACE	11.1%	0.0%	0.0%	0.0%	0.0%	14.8%	12.7%
		% of Total	3.8%	0.0%	0.0%	0.0%	0.0%	8.9%	12.7%
	8 50-59 years old	Count	6	0	0	1	0	25	32
		% within RACE	6.1%	0.0%	0.0%	20.0%	0.0%	14.2%	11.0%
		% of Total	2.1%	0.0%	0.0%	0.3%	0.0%	8.6%	11.0%
	9 60 and older	Count	3	0	0	1	1	24	29
		% within RACE	3.0%	0.0%	0.0%	20.0%	11.1%	13.6%	9.9%
		% of Total	1.0%	0.0%	0.0%	0.3%	0.3%	8.2%	9.9%
Total		Count	99	1	2	5	9	176	292
		% within RACE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	33.9%	0.3%	0.7%	1.7%	3.1%	60.3%	100.0%

Note: Source: ATR, 2013b.

Appendix C

Alaska Trauma Registry Results

Table C-1
Dog Bite Hospitalizations: Age Groups and Type of Injuries, ATR 2001-2011.

AgeGroup2 age group2 * NCODE1Re NCODE1 recoded Crosstabulation

			NCODE1Re NCODE1 recoded	
			1.00 open wound head/neck/face	2.00 open wound torso
AgeGroup2 age group2	1.00 0-4 y. old	Count	48	1
		% within NCODE1Re NCODE1 recoded	43.6%	20.0%
	2.00 5-9 y. old	Count	29	1
		% within NCODE1Re NCODE1 recoded	26.4%	20.0%
	3.00 10-19 y. old	Count	15	1
		% within NCODE1Re NCODE1 recoded	13.6%	20.0%
	4.00 20-39 y. old	Count	10	2
		% within NCODE1Re NCODE1 recoded	9.1%	40.0%
	5.00 40-59 y. old	Count	6	0
		% within NCODE1Re NCODE1 recoded	5.5%	0.0%
	6.00 60 and older	Count	2	0
		% within NCODE1Re NCODE1 recoded	1.8%	0.0%
Total		Count	110	5
		% within NCODE1Re NCODE1 recoded	100.0%	100.0%

Note: Source: ATR, *Note:* Source: ATR, 2013b.

AgeGroup2 age group2 * NCODE1Re NCODE1 recoded Crosstabulation

			NCODE1Re NCODE1 recoded	
			3.00 open wound upper limb	4.00 open wound lower limb
AgeGroup2 age group2	1.00 0-4 y. old	Count	3	2
		% within NCODE1Re NCODE1 recoded	2.9%	20.0%
	2.00 5-9 y. old	Count	5	1
		% within NCODE1Re NCODE1 recoded	4.8%	10.0%
	3.00 10-19 y. old	Count	11	1
		% within NCODE1Re NCODE1 recoded	10.5%	10.0%
	4.00 20-39 y. old	Count	21	3
		% within NCODE1Re NCODE1 recoded	20.0%	30.0%
	5.00 40-59 y. old	Count	43	2
		% within NCODE1Re NCODE1 recoded	41.0%	20.0%
	6.00 60 and older	Count	22	1
		% within NCODE1Re NCODE1 recoded	21.0%	10.0%
Total		Count	105	10
		% within NCODE1Re NCODE1 recoded	100.0%	100.0%

Note: Source: ATR, *Note:* Source: ATR, 2001-2011.

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AgeGroup2 age group2 * NCODE1Re NCODE1 recoded Crosstabulation

			NCODE1Re NCODE1 recoded	
			5.00 fracture skull/neck/torso /vertebral column	6.00 fracture upper limb/s
AgeGroup2 age group2	1.00 0-4 y. old	Count	1	1
		% within NCODE1Re NCODE1 recoded	50.0%	3.4%
	2.00 5-9 y. old	Count	1	6
		% within NCODE1Re NCODE1 recoded	50.0%	20.7%
	3.00 10-19 y. old	Count	0	6
		% within NCODE1Re NCODE1 recoded	0.0%	20.7%
	4.00 20-39 y. old	Count	0	3
		% within NCODE1Re NCODE1 recoded	0.0%	10.3%
	5.00 40-59 y. old	Count	0	10
		% within NCODE1Re NCODE1 recoded	0.0%	34.5%
	6.00 60 and older	Count	0	3
		% within NCODE1Re NCODE1 recoded	0.0%	10.3%
Total		Count	2	29
		% within NCODE1Re NCODE1 recoded	100.0%	100.0%

Note: Source: ATR, 2001-2011 .

AgeGroup2 age group2 * NCODE1Re NCODE1 recoded Crosstabulation

			NCODE1Re NCODE1 recoded	
			7.00 fracture lower limb/s	8.00 traumatic amputation upper/lower limb/s
AgeGroup2 age group2	1.00 0-4 y. old	Count	0	1
		% within NCODE1Re NCODE1 recoded	0.0%	50.0%
	2.00 5-9 y. old	Count	1	0
		% within NCODE1Re NCODE1 recoded	50.0%	0.0%
	3.00 10-19 y. old	Count	0	0
		% within NCODE1Re NCODE1 recoded	0.0%	0.0%
	4.00 20-39 y. old	Count	0	0
		% within NCODE1Re NCODE1 recoded	0.0%	0.0%
	5.00 40-59 y. old	Count	1	0
		% within NCODE1Re NCODE1 recoded	50.0%	0.0%
	6.00 60 and older	Count	0	1
		% within NCODE1Re NCODE1 recoded	0.0%	50.0%
Total		Count	2	2
		% within NCODE1Re NCODE1 recoded	100.0%	100.0%

Note: Source: ATR, 2001-2011.

AgeGroup2 age group2 * NCODE1Re NCODE1 recoded Crosstabulation

			NCODE1Re NCODE1 recoded	Total
			9.00 other and unspecified injuries	
AgeGroup2 age group2	1.00 0-4 y. old	Count	6	63
		% within NCODE1Re NCODE1 recoded	22.2%	21.6%
	2.00 5-9 y. old	Count	2	46
		% within NCODE1Re NCODE1 recoded	7.4%	15.8%
	3.00 10-19 y. old	Count	3	37
		% within NCODE1Re NCODE1 recoded	11.1%	12.7%
	4.00 20-39 y. old	Count	8	47
		% within NCODE1Re NCODE1 recoded	29.6%	16.1%
	5.00 40-59 y. old	Count	7	69
		% within NCODE1Re NCODE1 recoded	25.9%	23.6%
	6.00 60 and older	Count	1	30
		% within NCODE1Re NCODE1 recoded	3.7%	10.3%
Total		Count	27	292
		% within NCODE1Re NCODE1 recoded	100.0%	100.0%

Note: Source: ATR, 2013b.

Appendix D

Alaska Trauma Registry Results

Dog Bite Hospitalizations: Type of Injuries by Age groups and by Gender

The majority of males who had an open wound of head/neck/face (69.8%) were 0-9 years old; 17% of males with similar injuries were 10-19 years old, 7.9% were in the 20-39 age group, 3.2 % were age 60 and older, and 1.6% were 40-59 years old. In contrast, among men with open wound of upper limb only 9.4% were 0-9 years old, 12.5% were 10-19 years old, while 31.3% of males with same type of injuries were 40-59 years old; 25% were 20-39 years old, and 21.9% were 60 and older. Similar results were observed among females: 70.2% of females with open wound of head/neck/face were 0-9 years old; while 8.5% were 10-19 years old; 10.6% were 20-39 years old and10.6% were 40-59 years old. Over half of females with an open wound of upper limb (56.1%) were in the 40-59 year old age category, followed by 19.5% of 60 and older females; 12.2% of 20-39 year old females, 7.3% of 10-19 year old females, and 4.9% of 0-9 year old females.

Table D-1. *Dog Bite Hospitalizations: Type of Injuries by Age groups and by Gender, ATR 2001-2011.*

Age_re age recoded * NCODE1Re NCODE1 recoded * Gender_re gender recoded Crosstabulation

Gender_re gender recoded				NCODE1Re NCODE1 recoded			
				1.00 open wound head/neck/ face	2.00 open wound torso	3.00 open wound upper limb	4.00 open wound lower limb
1 MALE	Age_re age recoded	1.00 0-9 y.old	Count	44	2	6	2
			% within NCODE1Re NCODE1 recoded	69.8%	66.7%	9.4%	40.0%
		2.00 10-19 y.old	Count	11	0	8	1
			% within NCODE1Re NCODE1 recoded	17.5%	0.0%	12.5%	20.0%
		3.00 20-39 y.old	Count	5	1	16	1
			% within NCODE1Re NCODE1 recoded	7.9%	33.3%	25.0%	20.0%
		4.00 40-59y.old	Count	1	0	20	1
			% within NCODE1Re NCODE1 recoded	1.6%	0.0%	31.3%	20.0%
		5.00 60 and older	Count	2	0	14	0
			% within NCODE1Re NCODE1 recoded	3.2%	0.0%	21.9%	0.0%
	Total		Count	63	3	64	5
			% within NCODE1Re NCODE1 recoded	100.0%	100.0%	100.0%	100.0%
2 FEMALE	Age_re age recoded	1.00 0-9 y.old	Count	33	0	2	1
			% within NCODE1Re NCODE1 recoded	0.2%	0.0%	4.9%	20.0%
		2.00 10-19 y.old	Count	4	1	3	0
			% within NCODE1Re NCODE1 recoded	8.5%	50.0%	7.3%	0.0%
		3.00 20-39 y.old	Count	5	1	5	2
			% within NCODE1Re NCODE1 recoded	10.6%	50.0%	12.2%	40.0%
		4.00 40-59y.old	Count	5	0	23	1
			% within NCODE1Re NCODE1 recoded	10.6%	0.0%	56.1%	20.0%
		5.00 60 and older	Count	0	0	8	1
			% within NCODE1Re NCODE1 recoded	0.0%	0.0%	19.5%	20.0%
	Total		Count	47	2	41	5

			% within NCODE1Re NCODE1 recoded	100.0%	100.0%	100.0%	100.0%
			Count	77	2	8	3
		1.00 0-9 y.old	% within NCODE1Re NCODE1 recoded	70.0%	40.0%	7.6%	30.0%
			Count	15	1	11	1
		2.00 10-19 y.old	% within NCODE1Re NCODE1 recoded	13.6%	20.0%	10.5%	10.0%
			Count	10	2	21	3
	Age_re age recoded	3.00 20-39 y.old	% within NCODE1Re NCODE1 recoded	9.1%	40.0%	20.0%	30.0%
Total			Count	6	0	43	2
		4.00 40-59y.old	% within NCODE1Re NCODE1 recoded	5.5%	0.0%	41.0%	20.0%
			Count	2	0	22	1
		5.00 60 and older	% within NCODE1Re NCODE1 recoded	1.8%	0.0%	21.0%	10.0%
			Count	110	5	105	10
	Total		% within NCODE1Re NCODE1 recoded	100.0%	100.0%	100.0%	100.0%

Note: Source: ATR, 2001-2011.

Age_re age recoded * NCODE1Re NCODE1 recoded * Gender_re gender recoded Crosstabulation

Gender_re gender recoded				NCODE1Re NCODE1 recoded			
				5.00 fracture skull/neck/torso/vertebral column	6.00 fracture upper limb/s	7.00 fracture lower limb/s	8.00 traumatic amputation upper/lower limb/s
1 MALE	Age_re age recoded	1.00 0-9 y.old	Count		3		1
			% within NCODE1Re NCODE1 recoded		23.1%		50.0%
		2.00 10-19 y.old	Count		3		0
			% within NCODE1Re NCODE1 recoded		23.1%		0.0%
		3.00 20-39 y.old	Count		0		0
			% within NCODE1Re NCODE1 recoded		0.0%		0.0%
		4.00 40-59y.old	Count		7		0
			% within NCODE1Re NCODE1 recoded		53.8%		0.0%
		5.00 60 and older	Count		0		1
			% within NCODE1Re NCODE1 recoded		0.0%		50.0%
	Total		Count		13		2
			% within NCODE1Re NCODE1 recoded		100.0%		100.0%
2 FEMALE	Age_re age recoded	1.00 0-9 y.old	Count	2	4	1	
			% within NCODE1Re NCODE1 recoded	100.0%	25.0%	50.0%	
		2.00 10-19 y.old	Count	0	3	0	
			% within NCODE1Re NCODE1 recoded	0.0%	18.8%	0.0%	
		3.00 20-39 y.old	Count	0	3	0	
			% within NCODE1Re NCODE1 recoded	0.0%	18.8%	0.0%	
		4.00 40-59y.old	Count	0	3	1	
			% within NCODE1Re NCODE1 recoded	0.0%	18.8%	50.0%	
		5.00 60 and older	Count	0	3	0	
			% within NCODE1Re NCODE1 recoded	0.0%	18.8%	0.0%	

			Count	2	16	2	
	Total		% within NCODE1Re NCODE1 recoded	100.0%	100.0%	100.0%	
			Count	2	7	1	1
		1.00 0-9 y.old	% within NCODE1Re NCODE1 recoded	100.0%	24.1%	50.0%	50.0%
			Count	0	6	0	0
		2.00 10-19 y.old	% within NCODE1Re NCODE1 recoded	0.0%	20.7%	0.0%	0.0%
			Count	0	3	0	0
	Age_re age recoded	3.00 20-39 y.old	% within NCODE1Re NCODE1 recoded	0.0%	10.3%	0.0%	0.0%
Total			Count	0	10	1	0
		4.00 40-59y.old	% within NCODE1Re NCODE1 recoded	0.0%	34.5%	50.0%	0.0%
			Count	0	3	0	1
		5.00 60 and older	% within NCODE1Re NCODE1 recoded	0.0%	10.3%	0.0%	50.0%
			Count	2	29	2	2
	Total		% within NCODE1Re NCODE1 recoded	100.0%	100.0%	100.0%	100.0%

Note: Source: ATR, 2013b.

Age_re age recoded * NCODE1Re NCODE1 recoded * Gender_re gender recoded Crosstabulation

Gender_re gender recoded				NCODE1Re NCODE1 recoded	Total
				9.00 other and unspecified injuries	
1 MALE	Age_re age recoded	1.00 0-9 y.old	Count	5	63
			% within NCODE1Re NCODE1 recoded	35.7%	38.4%
		2.00 10-19 y.old	Count	2	25
			% within NCODE1Re NCODE1 recoded	14.3%	15.2%
		3.00 20-39 y.old	Count	4	27
			% within NCODE1Re NCODE1 recoded	28.6%	16.5%
		4.00 40-59y.old	Count	2	31
			% within NCODE1Re NCODE1 recoded	14.3%	18.9%
		5.00 60 and older	Count	1	18
			% within NCODE1Re NCODE1 recoded	7.1%	11.0%
	Total		Count	14	164
			% within NCODE1Re NCODE1 recoded	100.0%	100.0%
2 FEMALE	Age_re age recoded	1.00 0-9 y.old	Count	3	46
			% within NCODE1Re NCODE1 recoded	23.1%	35.9%
		2.00 10-19 y.old	Count	1	12
			% within NCODE1Re NCODE1 recoded	7.7%	9.4%
		3.00 20-39 y.old	Count	4	20
			% within NCODE1Re NCODE1 recoded	30.8%	15.6%
		4.00 40-59y.old	Count	5	38
			% within NCODE1Re NCODE1 recoded	38.5%	29.7%
		5.00 60 and older	Count	0	12
			% within NCODE1Re NCODE1 recoded	0.0%	9.4%
	Total		Count	13	128
			% within NCODE1Re NCODE1 recoded	100.0%	100.0%
Total	Age_re age recoded	1.00 0-9 y.old	Count	8	109
			% within NCODE1Re NCODE1 recoded	29.6%	37.3%
		2.00 10-19 y.old	Count	3	37
			% within NCODE1Re NCODE1 recoded	11.1%	12.7%
		3.00 20-39 y.old	Count	8	47
			% within NCODE1Re NCODE1 recoded	29.6%	16.1%
		4.00 40-59y.old	Count	7	69
			% within NCODE1Re NCODE1 recoded	25.9%	23.6%
		5.00 60 and older	Count	1	30

	% within NCODE1Re NCODE1 recoded	3.7%	10.3%
Total	Count	27	292

Note: Source: ATR, 2013b.

Two bar graphs for female and male victims with different injury categories.

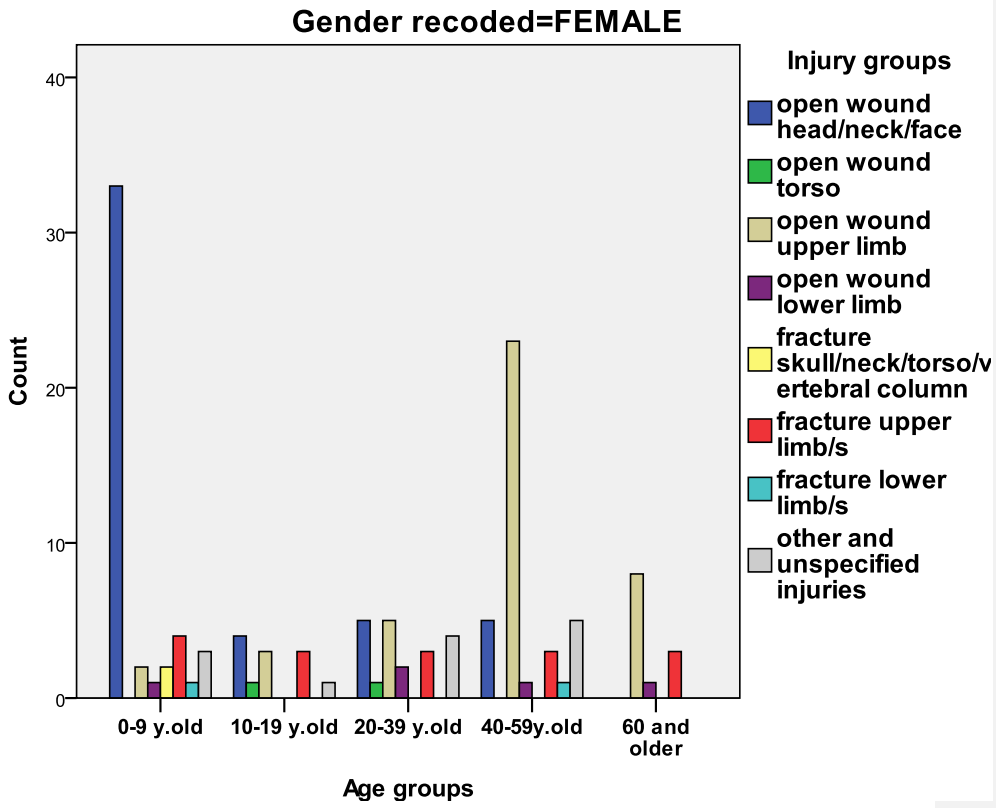


Figure D-1. *Female dog bite victims with different type of injury.*

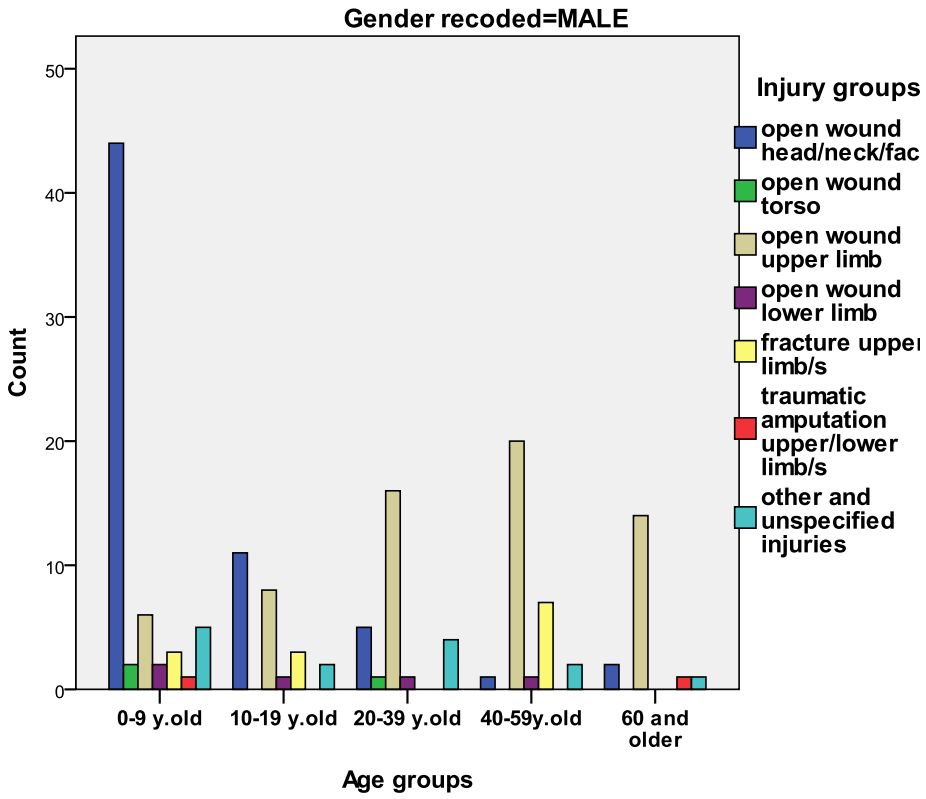


Figure D-2. *Male dog bite victims with different types of injury.*

Appendix E

ASPCA Recommendations for Parents:

The following is reproduced verbatim from:(http://www.aspca.org/pet-care/virtual-pet-behaviorist/dog-behavior/dog-bite-prevention)

Be aware of the fact that any dog can bite. From the smallest to the largest, even the most friendly, cute and easygoing dogs might bite if provoked. The vast majority of dog bites are from a dog known to the child—his or her own pet, a neighbor's or a friend's. You can help protect your child from dog bites by discussing with her the appropriate way to behave around dogs. To help parents educate their children about basic safety around dogs, we offer the following tips:

- Children should not approach, touch or play with any dog who's sleeping, eating, chewing on a toy or bone, or caring for puppies. Animals are more likely to bite if they're startled, frightened or caring for young.
- Children should never approach a barking, growling or scared dog.
- Children should not pet unfamiliar dogs without asking permission from the dog's guardian first. If the guardian says its okay, the child should first let the dog sniff his closed hand. Then taking care to avoid petting the dog on the top of the head, he can pet the dog's shoulders or chest.
- Children should not try to pet dogs who are behind a fence or in a car. Dogs often protect their home or space.

- If a child sees a dog off-leash outside, she should not approach the dog and should tell an adult immediately.
- If a loose dog comes near a child, he should not run or scream. Instead, he should avoid eye contact with the dog and stand very still, like a tree, until the animal moves away. Once the dog loses interest, the child can slowly back away until he's out of sight.
- If a child falls down or is knocked to the ground by a dog, she should curl up in a ball with her knees tucked into her stomach and her fingers interlocked behind her neck to protect her neck and ears. If a child stays still and quiet like this, the dog will most likely just sniff her and then go away.
- Children should never try to outrun a dog. If a dog does attack a child, the child should "feed" the dog his jacket, bag, bicycle—or anything that he has for the dog to grab onto or anything he can put between himself and the dog.

The following activity will help you and your child understand the difference between safe and potentially dangerous interactions with dogs. Recite aloud with your child the following list of pledges:

1. I will not stare into a dog's eyes.
2. I will not tease, try to go near or pet dogs behind fences, dogs in cars, or dogs chained or tied up in yards.
3. I will not touch a dog I see loose (off-leash) outside.
4. If I see a loose dog, I will tell an adult immediately.
5. I will not run and scream if a loose dog comes near me.

6. I will stand still like a tree and be very quiet if a dog comes near me.
7. I will not touch or play with a dog while she's eating or sleeping.
8. I will only pet a dog if I have permission from the dog's owner.
9. Then I will introduce myself to the dog by letting her sniff my closed hand.

Understanding dog body language is another key way to help you and your children avoid being bitten. Teach your children that they can read dogs' body language to better understand what dogs are feeling and avoid those whose body language indicates that they're feeling anxious, afraid, threatened or aggressive. Please see our Canine Body Language article for drawings of dogs showing what various feelings look like in dog body language.

- An aggressive dog may try to make herself look bigger. Her ears may be up and forward, the fur on her back and tail may stand on end or puff out, and her tail may be straight up—it may even wag. She may have a stiff, straight-legged stance and be moving toward or staring directly at what she thinks is an approaching threat. She may also bare her teeth, growl, lunge and bark. Continued approach toward a dog showing this body language could result in a bite.
- An anxious or scared dog may try to make herself look smaller. She may shrink to the ground in a crouch, lower her head, repeatedly lick her lips, put her tail between her legs, flatten her ears back and yawn. She may look away to avoid direct eye contact. She may stay very still or roll on her back and expose her stomach. Alternatively, she may try to turn away or slowly move away from what she thinks is an approaching

threat. If she can't retreat, she may feel she has no other alternative but to defensively growl, snarl or even bite.

- Many dogs can show a mixture of these body postures, indicating that they feel conflicted. The main idea for children to remember is to avoid any dog showing any of signs of fear, aggression or anxiety—no matter what else the dog is doing. It's important for children to realize that a wagging tail or a crouching body doesn't always mean friendliness.

The main lesson for children practicing safety around dogs is to not chase or tease dogs they know and to avoid dogs they don't know. The ASPCA Online Store offers several teaching tools that can make learning about how to be safe around animals fun, including Dogs, Cats & Kids (DVD and video), Dogs, Cats & Big Kids (DVD and video), the Teaching Bite Free Package (DVD and video), and a Dog Bite Prevention Activity Worksheet. The National Association for Humane and Environmental Education (NAHEE) also offers The BARK (Be Aware, Responsible and Kind) Dog Bite Prevention Program, the Play It Safe with Dogs coloring book in English and Spanish, and the Doggone Crazy family board game.

Please see this website for more information: http://www.nahee.org/.

Appendix F

ASPCA Recommendations for Pet Guardians

The following is reproduced verbatim from:

(http://www.aspca.org/pet-care/virtual-pet-behaviorist/dog-behavior/dog-bite-prevention)

Although you can't guarantee that your dog will never bite someone, there are many ways that you can significantly reduce the risk.

- Spay or neuter your dog as soon as possible. Healthy puppies can be spayed or neutered as early as eight weeks of age. Spayed or neutered dogs may be less likely to bite.
- Socialize your dog! An ounce of prevention (puppy socialization) is worth a pound of cure (trying to fix behavior problems in adulthood). Well-socialized dogs make enjoyable, trustworthy companions. Under socialized dogs are a risk to their owners and to others because they're frightened by everyday things. Fearful dogs are more likely to aggress or bite. They tend to fight with other dogs. They don't adapt to new situations, and routine outings (like to the vet's office) become difficult for them and everyone involved. Socializing is the opposite of isolating. It means to let puppies meet, greet and enjoy a variety of people, animals, places and things. Done properly, socializing helps puppies feel comfortable and friendly—rather than uncomfortable and potentially aggressive—in many situations and around all kinds of people and animals. The main rule for effective socializing is to let your dog progress at her own pace and never force her to be around someone or something when she's clearly

fearful or uncomfortable. Please see our article, Socializing Your Puppy, for more information.

- Take your dog to humane, reward-based training classes—the earlier the better. We recommend starting your puppy in puppy kindergarten classes as early as eight weeks, right after her first set of vaccinations. Early training opens a window of communication between you and your dog that will help you consistently and effectively teach her what you expect of her.
- Make your dog a part of the family. Don't chain or tie her outside, and don't leave her unsupervised for long periods of time—even in a fenced yard. Because tied-out dogs become frustrated and can feel relatively defenseless, they're nearly three times more likely to bite. Well-socialized and supervised dogs are much less likely to bite.
- Don't wait for a serious accident to happen. The first time your dog shows aggressive behavior toward anybody, even if no injury occurs, seek professional help from a Certified Applied Animal Behaviorist (CAAB), a veterinary behaviorist (Dip ACVB), or a qualified Certified Professional Dog Trainer (CPDT). If you elect to hire a CPDT because you can't find a behaviorist in your area, be sure to determine whether she or he has professional training and extensive experience in successfully working with aggression, as this training and experience are beyond what CPDT certification requires. Please see our article, Finding Professional Help, for information about finding an expert in your area. Your community animal control agency or humane society may also offer or be able to refer you to helpful services.

- Err on the safe side. Be aware of common triggers of aggression, including pain, injury or sickness, the approach of strangers or strange dogs, the approach of people in uniforms, costumes or unusual attire (especially hats), unexpected touching, unfamiliar places, crowds, and loud noises like thunder, wind, construction, fireworks and appliances. If possible, avoid exposing your dog to these triggers. If she seems stressed or panicked in crowds, leave her at home. If she overreacts to visitors or delivery personnel, keep her in another room when they come to your house. Work with a qualified behavior and training professional to help your dog become more comfortable with these and other situations. Please see our article, Finding Professional Help, for information about finding an expert in your area.
- Always supervise children and dogs. Never leave a baby or child younger than 10 years old alone with a dog. Teach your children to treat your dog gently and with respect, giving the dog her own space and opportunities to rest. Some good books and videos that we recommend on children and dogs are Living with Kids & Dogs…Without Losing Your Mind by Colleen Pelar, Raising Puppies and Kids Together—A Guide for Parents by Pia Silvani and Lynn Eckhardt, Child-Proofing Your Dog by Brian Kilcommons, and Dogs, Cats & Kids, a video by the Humane Society of the United States (HSUS). For more information about children and dogs, please see our article entitled Children and Pets Living Together.
- Fulfill basic animal-care responsibilities. License your dog as required by law and provide regular veterinary care, including rabies vaccinations. Don't allow your dog to roam alone.

Appendix G

Follow up letter to Alaskan entities proposing formalized record keeping

Comment [RM1]: This is great effort, but if possible, I would suggest this be reduced to no more than one page that highlights your key findings and the benefit of better recordkeeping for everyone.

Dog bite injuries and fatalities have been a major public health problem in Alaska, with hospitalization rates due to dog bite consistently higher than national rates. While severe injuries that required hospitalization are reported through the Alaska Trauma Registry, usually minor dog bite injuries are not tracked due to lack of reporting by victims, inconsistent record keeping at the local level, and limited collection and documenting of this data at the state level.

Dog bite injury hospitalizations are not as numerous as falls or motor vehicle accidents, but are ranked in seventh place as a leading cause of non-fatal injury hospitalizations for children age 1-9 in Alaska during 2005-2009. Dog bite injuries required hospitalization of young children ages 1-9 with the same general frequency (21-24) as suffocation injuries, motor vehicle injuries, and cuts (Alaska Injury Surveillance Report, 2011). The physical and emotional toll on victims, especially children, is significant. When more serious injuries are airlifted to regional medical facilities there are even greater financial and emotional costs.

A recent study under the supervision of the State of Alaska, Department of Health and Social Services, Section of Epidemiology (SOE) has shown that the vast majority of dog bites in Alaska are unreported, the health burden of dog bite injuries is much higher than previously described, and the Alaskan Native population and children aged 0-9 are disproportionately affected. In regards to the injury pyramid, from 2001-2011 the Alaska Trauma Registry recorded 292 hospitalizations due to dog bite injury (average annual

number of 27 hospitalizations), while during a similar time frame those animal control entities that participated in the recent Alaskan study reported 8,942 dog bites throughout Alaska (average of 813 bites annually). Unreported dog bites that make up the bottom of the dog bite injury pyramid can be estimated through these agencies and provide the scientific base for preventive interventions and resource allocation.

Even though number of dog bites required medical attention is lower than other leading causes of injuries in Alaska, still this public health problem is preventable. Medical providers mainly involve with secondary and tertiary dog bite prevention, however more efforts should be made on occurrence prevention. This can be achieved through educational interventions targeting preschool and school age children, community outreach regarding responsible dog ownership, control of free-roaming dogs, enforcing leash law and ordinances, spay/neuter programs, and identifying and controlling dogs with aggressive behaviors.

Reduction of dog bite incidents that can lead to minimizing the public health burden requires cooperation between organizations such as SOE, animal control and police departments, educators and health care professionals. The results of this project suggest that a standardized reporting and collection process would improve the ability to quantify the problem and assist with prevention efforts. Attached is a simple reporting form template recommended to be filled out by a health care professional, an animal control or police officer and to be sent to SOE on a yearly basis. We thank you for your help and cooperation and encourage you to phone us with questions and comments on this process.

Appendix H

Table H-1

Reported Dog Bites by Local Entities, 2002-2012.

Alaska regions	02	03	04	05	06	07	08	09	10	11	12	Total bites
Northern	--	--	---	--	---	2	20	17	20	16	18	93
Interior		271	260	262	241	216	216	223	222	227	247	2,385
Southwest	--	--	--	--	---	---	---	---	---	----	--	----
Anchorage	525	486	520	537	517	523	509	496	460	495	551	5,619
Gulf Coast		5	11	10	13	11	7	3	4	4	5	73
Southeast	54	55	57	82	73	87	69	75	67	77	76	772
Total	579	817	848	891	844	839	821	814	773	819	897	8,942

Note: Source: State of Alaska, Department of Health and Social Services, Section of Epidemiology , 2013a.

Table H-2
Summary of Dog Bite Reports by Entities, 2002-2012.

Case Summaries

				geographic location	TotalofReported DogBites
Year	2002	1		Skagway	5
		2		MOA	525
		3		Petersburg	4
		4		Sitka	36
		5		Wrangell	9
		Total	N	5	5
			Sum		579
	2003	1		Fairbanks	271
		2		Kodiak	5
		3		Skagway	2
		4		MOA	486
		5		Petersburg	2
		6		Sitka	44
		7		Wrangell	7
		Total	N	7	7
			Sum		817
	2004	1		Fairbanks	260
		2		Kodiak	11
		3		Skagway	5

	4		MOA		520
	5		Petersburg		2
	6		Sitka		46
	7		Wrangell		4
	Total	N		7	7
		Sum			848
2005	1		Fairbanks		262
	2		Juneau		36
	3		Kodiak		10
	4		Skagway		4
	5		MOA		537
	6		Petersburg		1
	7		Sitka		34
	8		Wrangell		7
	Total	N		8	8
		Sum			891
2006	1		Fairbanks		241
	2		Juneau		46
	3		Kodiak		13
	4		Skagway		2
	5		MOA		517
	6		Petersburg		2
	7		Sitka		17
	8		Wrangell		6
	Total	N		8	8
		Sum			844
2007	1		Fairbanks		216
	2		Juneau		56
	3		Kodiak		11
	4		NSB		2
	5		Skagway		2
	6		MOA		523
	7		Petersburg		1
	8		Sitka		24
	9		Wrangell		4
	Total	N		9	9
		Sum			839
2008	1		Fairbanks		216
	2		Juneau		31
	3		Kodiak		7
	4		NSB		20
	5		Skagway		5
	6		MOA		509
	7		Petersburg		2
	8		Sitka		28
	9		Wrangell		3
	Total	N		9	9
		Sum			821

2009	1		Fairbanks		223
	2		Juneau		41
	3		Kodiak		3
	4		NSB		17
	5		Skagway		7
	6		MOA		496
	7		Petersburg		3
	8		Sitka		20
	9		Wrangell		4
	Total	N		9	9
		Sum			814
2010	1		Fairbanks		222
	2		Juneau		37
	3		Kodiak		4
	4		NSB		20
	5		Skagway		2
	6		MOA		460
	7		Petersburg		1
	8		Sitka		20
	9		Wrangell		7
	Total	N		9	9
		Sum			773
2011	1		Fairbanks		227
	2		Juneau		51
	3		Kodiak		4
	4		NSB		16
	5		Skagway		2
	6		MOA		495
	7		Petersburg		3
	8		Sitka		20
	9		Wrangell		1
	Total	N		9	9
		Sum			819
2012	1		Fairbanks		247
	2		Juneau		54
	3		Kenai		12
	4		Kodiak		5
	5		NSB		18
	6		Skagway		4
	7		MOA		551
	8		Petersburg		1
	9		Sitka		14
	10		Wrangell		3
	Total	N		10	10
		Sum			909
Total	N			90	90
	Sum				**8954**

Note: Source: State of Alaska, Department of Health and Social Services, Section of Epidemiology, 2013a.

Appendix I

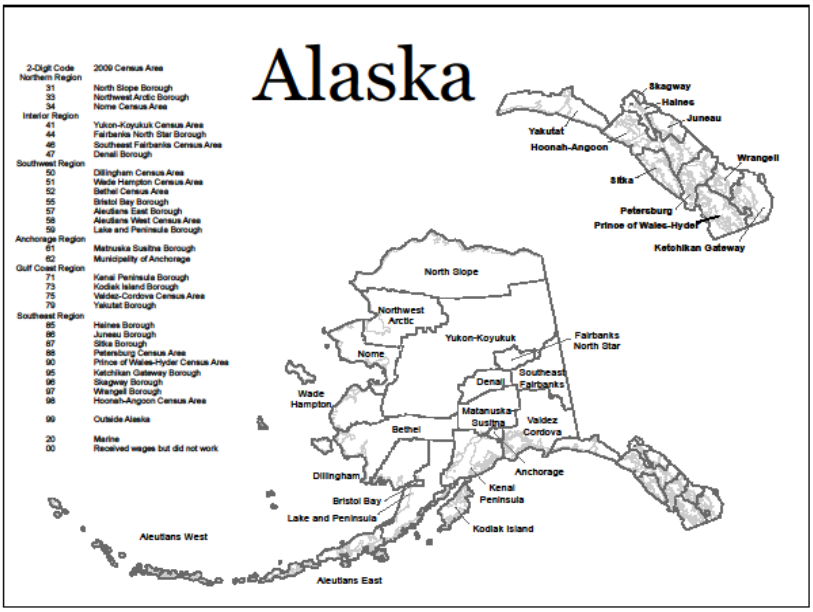
Dog-Bite Record Spreadsheet

AGREGATE TOTALS FOR EACH YEAR: **Year**

Geographic Location (town)
Date of the incidence: month/year
Victim's Age/Unknown (UNK)
Victim's Gender: Male/Female/UNK
Victim's Race
Location of injury
Medical Attention Provided Locally/Yes/NO/UNK
Dog Was Vaccinated Against Rabies/Yes/No/UNK
Dog was Quarantined/Yes/NO/UNK
Dog was Sent for Rabies Testing/Yes/NO/UNK
Dog was Destroyed Before Quarantine /Yes/NO/UNK
Follow up contact with the victim/Yes/NO/#/UNK
Dog Breed Information/Yes/No/UNK
Dog Spay/Neuter Status/Yes/NO
Dog Ownership Status/Yes/NO
History of Prior Aggression/Yes/NO/UNK
Dog Restrain Status Prior the Incident
Circumstances of the incidence/narrative

Appendix J

Alaska Regional Map



Appendix K

EXECUTIVE SUMMARY

Dog Bite Health Burden in Alaskan Communities 2002-2012, USA.

INTRODUCTION: The objective is to assess public health burden of recorded dog bite injuries in Alaska for 2002-2012. The conducted research was a first attempt in Alaska to consolidate and analyze scattered dog bite records with and without medical attention.

METHODS: A cross-sectional study design and descriptive statistical analysis with SPSS software were used to quantify the problem. Two data sets were created based on statewide hospitalizations records from Alaska Trauma Registry for 2001-2011 (2012 data was not available at the time of the study) and records from local governmental entities throughout the state for 2002-2012.

RESULTS: During 2001-2011 there were 292 hospitalization cases requiring a total of 754 hospital days with a range of 1-28 days, Mean was 2.83 days, St. D.= 3.27. Of the total 292 cases, (164 males or 56.2% and 128 females or 43.8%), 246 were minor injuries (84.2%), 1 case (0.3%) was critical/fatal (6 year old female); two cases (0.7%) required traumatic amputation (1 case of thumb amputation and 1 case of partial/complete hand amputation).

Out of the 246 minor injuries nearly half (121 or 49.2%) occurred to 0-19 year old victims. Similar age patterns were observed for moderate and serious injuries. Children more often were injured to their head/face/ neck areas, while adults were more often bitten on upper limbs. Combined these two injury types made up to almost 70% of minor injuries. By age group, the highest annual rate of dog bite hospitalization of 11.3/100,000 population was for 0-4 year old victims, followed by a rate of 8.7/100,000 for 5-9 year

old victims. As age increased, the frequency of head/neck/face injuries decreased, and the frequency of open wound of upper limb/s increased.

By race a majority (64.7%) of dog bite victims were non-Alaska Native people compared to Alaska Native people (35.3%). However, Alaska Native victims had longer average hospital stays and a higher annual average hospitalization rate compared to non-Alaska Native victims (3.74 hospital days vs.2.36 days and 7.2/100,000 population vs. 2.8/100,000).

The average annual rate of dog bite hospitalizations with known geographic region was 3.8 per 100,000 population with the highest rate of 8.5/100,000 population in the Northern region and the lowest rate 1.7/100,000 the Southeast region.

Most of the injuries happened in early summer through early fall; over 90% of hospitalizations were not work related (98.3%) and without alcohol (94.9%) or recreational drug involvement (98.6%).

In addition to the Trauma Registry of hospital admittance, a vast number of dog bite injuries were inconsistently recorded at local community levels. Governmental entities that responded to the data request for this study covered 64.7% of Alaska's 2010 Census population of 710,231 people. In this population, there were 8,942 dog bites recorded during 2002 to 2012. Overall, annual prevalence rate was 180/100,000 people for the 11 year period. The areas with the highest annual prevalence rate were the Interior (231/100,000 population) and Anchorage (190/100,000).

CONCLUSIONS: Dog bites are not mandatory to report to Alaskan public health officials, therefore, these injuries appear to be under reported or not reported at all in

many communities. Health burden of dog bite injuries in Alaska is much higher than previously described. Results were consistent with previous studies in that young children and the Alaska Native population are disproportionally affected by dog bite injuries. ATR records capture only a small portion of dog bite injuries. Even among those entities reporting data, lack of adequate record keeping regarding rabies vaccination, licensing status, dog breed, and other detailed information limits scientific analysis.

RECOMMENDATIONS:

Community level

A. Surveillance and recordkeeping:

1. Improve surveillance of dog bites by adoption of the proposed standardized form.
2. Encourage victims to self-report to animal control authorities.
3. Encourage health care practitioners to report dog bite injuries to animal control authorities.
4. Include when recording dog bite injuries accurate information regarding rabies vaccination and pet licensing.

B. Education:

1. Educational efforts for children should be in spring prior to the high risk season of summer vacation for school children and more outdoor activity leading to increased interactions with dogs.

2. Emphasis of adult educational efforts should focus on care givers of children and seniors, teachers, and pediatric and other health care providers.

C. Prevention/Model local ordinances and legislation:

1. Communities need to review and update their local ordinances regarding "dangerous" animals and responsible pet ownership and restraint.

Recommendations for family level:

1. Inform and educate their own children regarding the dangers of dog bites.
2. Teach and practice with children how to interact with dogs.
3. Teach all family members including seniors and care givers how to respond to a dog attack.
4. Follow the recommendations from the American Society for the Prevention of Cruelty to Animals (ASPCA) for selection and care of pets in the home.

Recommendations for the individual level:

1. Encourage individuals and children to report unusual interactions with dogs (loose dog, dog pack, dog aggression and attacks).

   Encourage individuals to report even minor injuries to authorities, especially when involving unknown dogs. Discuss and follow basic rules of dog safety. Practice proper response to dog attacks.